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THE IRON AGE

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BETHLEHEM STEEL COMPANY



... THE IRON AGE ...

ESTABLISHED 1855

September 9, 1937

Vol. 140, No. 11

Our "Untouchables" Need A Gandhi

THERE isn't a great deal of democracy in India. There cannot be in any country where the caste system flourishes.

If you are fortunate enough to be born a high caste Hindu, you stay that way. So do your children and your children's children to the n'th generation. But if the stork had happened to lose his way and had dropped you into the hut of an "untouchable", you and your descendants would be equally fixed in a permanent and most unfortunate mold. You would be considered, by all other castes, as an object of contempt. They might not "hold their noses" when you passed by, but they would consider themselves defiled by your touch.

Mahatma Gandhi, while not of this caste, took up the cudgels in the cause of India's untouchables. Gandhi, as an apostle of real democracy, knows that democracy and the caste system do not mix.

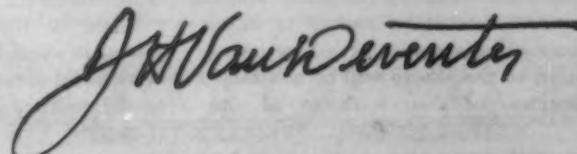
We need a Gandhi, or several of them, in this country to plead the cause of the new caste of untouchables that has been created by the New Deal. I refer to employers of labor, those who have built up businesses which show a profit from time to time, and to the frugal and saving people who through initiative, industry and frugality have gathered a competency.

In the old days a man who built a business and thereby created jobs for other people was rather proud of it. Today, he would hesitate to walk down the street of any large city, wearing the label "Employer". You could flaunt the red necktie of communism and get away with it; you could wear the flowing locks and the frock coat of the demagogue and be acclaimed by the mob; you could even sport the horizontal stripes of the ex-convict and be hail fellow well met. But an employer? Phooey on the economic royalist! He's a no good.

Now, of course, no intelligent person will make bold to say that the New Deal considers all employers to be reprobates. But the trouble is that it has drawn no line so that the public can distinguish the sheep from the goats. Its generalizations to the public tend to put all employers in the untouchable caste. Make them all goats.

It would be only fair if we were told just what constitutes a good employer, if any are so considered. Does it depend upon the hours and wages in his plant? Is he a good employer if he signs up with Mr. Lewis or Mr. Green, or bad if he refuses to recognize either? Are large employers bad and small ones good, or is the definition based upon whether or not either of them voted for the Democratic ticket or contributed to the Liberty League?

We need some definitions to enable us to segregate these untouchables. We have been told that only 10 per cent of American employers are bad. For the sake of the 90 per cent who are presumably good, the bad ones ought to be properly labeled.





CENTRAL tool supply and maintenance department of the Warner & Swasey Co. showing in the foreground grinding equipment that is used exclusively for reconditioning cutting tools and in the background the tool storage bins. There are 32 of these bins with numbered rows, lettered sections and individual bin numbers.

Centralized Tool Room Eliminates



A centralized tool supply and maintenance department for tools, gages, jigs and fixtures is provided by the Warner & Swasey Co., Cleveland, for use in the manufacture of turret lathes. By supplying tools from one source, all tool cribs have been eliminated except one in the tool room and on the assembly floor. The tool supply and maintenance department, which is entirely independent of the tool room, is centrally located on the third floor of the 5-story plant and this department delivers the tools to the various production departments, keeps the cutting tools properly sharpened and looks after the repairs of jigs and fixtures.

With the manufacture of ten different models of lathes there are few long runs on a single operation and frequent tool changes and new set-ups are required. For this reason high efficiency in plant operation makes it necessary to have tools always ready for a new operation so that there will be no delay. Because of the character of the

production work, large quantities of special tools and fixtures are required, these numbering in the thousands.

Before the centralized tool supply department was established tool cribs were maintained on each floor, tools were often borrowed by one department from another, perhaps located on a different floor, and there was trouble in locating tools.

With a central tool supply department the foremen are relieved of all responsibility in providing tools for their men further than advising the tool supply department in time when tools are wanted. A machine operator when he is ready to start on a job finds all the tools and fixtures needed for his job stacked on a skid platform at the side of his machine. Under the regular time schedule the tool supply department is allowed one hour to gather a set of tools and fixtures together and deliver them to the machine that is to use them.

Tools in the supply room are stored in steel bins arranged in 16 stands and extending from the floor to the ceiling. Each stand consists

of two rows of bins joined back to back, thus providing 32 rows of bins.

Most of the bins are 8 in. to 12 in. wide and there are twelve tiers of these bins in each stand. However, larger bins and racks are provided for the smaller fixtures and the large fixtures are stored on skids on the floor at one side of the room.

Traveling Ladders

Between the rows of bins there are narrow aisles and in these traveling ladders are located in order to handle tools in the upper bins that cannot be reached from the floor. All tools and fixtures are classified as either standard or special, the latter being used for only one particular operation. Standard small tools such as drills, taps, reamers and also bushings are stored in the first aisle, taking a very small amount of space as compared with the special tools and fixtures that occupy the remainder of the bin space. Practically all special tools are kept in the store-room except possibly large boring fixtures that are frequently used

and are kept near the machines to which they are attached.

The bins are numbered at each end and those on each side of an aisle are subdivided into lettered sections and each bin also carries a number. On each special tool is stamped the tool number, the bin number and the part number for which it is used. Attached to each bin in a metal case is a removable card on which is listed all the tools carried in the bin. An entry with the date is made on this card, both when a tool is taken out and when it is returned. All standard tools are also identified by stamped numbers.

Grinding equipment for the maintenance of cutting tools is conveniently located in the tool supply department room. Tools on being inspected on their return to this room are sent to the grinding machines if they need reconditioning. The grinding equipment consists of 12 machines including six cutters, one reamer, one saw, one chaser, one tap, one drill and six external grinders.

Jigs and fixtures on their return to the tool supply room are inspected and if in need of repairs are sent to the tool room to be reconditioned. Nearly all jigs and

fixtures are of welded steel construction.

While operating on three turns, the tool supply and maintenance department employs 31 men including the grinding machine operators.

While all the new jigs and fixtures required are made in the tool room, this department is used largely for making holding, gaging and cutting devices for the company's standard machine tool products and for that reason the tool room might be classed as a semi-production department.

Adjoining the tool supply department is a small stock room where drills, end mills and other small

Tool Crib Troubles

By FRED L. PRENTISS
Cleveland Editor, THE IRON AGE

PART NO. 470-243	OPER. 1	DEPT. 44
NAME Friction Gear	MACH. T2ACB	
OPER. Chuck, turn, bore, ream, rough taper		
and face end		
(over)	DATE 3-16-36	
NO. REQ'D	TOOLS AND GAUGES	SECT. BIN
1	470-126-6 Chuck Jaws	7F 22
1	470-126-7 Facing Tool	B B
1	470-126-8 Taper Tool	B B
1	470-243-1 Limit Snap Gage	B B
1	M-496 Slide Tool	
2	M-497 Turning & Facing Heads	
2	M-497-1002 Holders	
2	M-499 Flanged Tool Holders	
1	M-640 Boring Tool Holder	
1	M-869 Boring Bars	
1	M-869-1002 Cutter	
2	M-950 Drill Sockets #4 M.T.	
1	T-201-1 Turning Tool	
1	T-201-4 Bent Round Nose Cutter	
2	T-217-19 Cutters	
1	T-236-8 Boring Tool	
1	2" H.S. Drill 3" Flute #4 M.T.	
1	2-1/16" H.S. Core Drill 1-1/2" Shank	
1	2-1/8" Peerless Reamer #4 M.T.	
1	2-1/8" Plug Gage	
1	1-1/4" Bar Gauge	

PART NO.	OPER.	DEPT.			
NAME	MACH.				
NO.	SUB-OPERATIONS	R.P.M.	SUR. FT. FOR HOLE	FEED	TIME IN MIN.
1.	Chuck				1.00
2.	Center end	187	85	93	.70
3.	Core drill 2-1/16" hole 2-1/2" deep & at same time rough turn 6.500 dia. 1-3/8 long and rough face outside face	57	35	93	6.00
4.	Rough face inside face and rough taper (2 cuts)	57	100	132	
		57	70	93	4.20
		57	70	H	4.00
		57	70	93	
5.	Finish face inside face	140	120	132	2.30
	Finish form taper and	42	50	H	2.20
	Finish face outside face	103	140	132	2.20
6.	Bore to reaming size and Finish turn outside dia.	187	110	194	6.50
		103	140	194	
7.	Ream 2-1/8" hole	57	32	66	4.50
8.	Square shoulder in bottom	57	65	H	.70
9.	File, burr, try gauge and remove				.70
SETTING UP TIME 1.50 SET TIME .642 APPROVED EHR DATE 9-10-20 TOTAL 35.00					

NOTE: Any change in tool set up or speeds and feeds notify planning department.

FORM 41

IF TOOLS ARE NOT CORRECT NOTIFY THE PLANNING DEPARTMENT FORM 40

Fig. 1—Tools required for each sub-operation and the sequence of sub-operation is listed on "set-up" cards

tools are kept in stock to replenish the supply in the stock bins when tools become broken or worn out.

Schedule Forms

Several forms are provided for scheduling operations and listing

methods and standards departments and a yellow copy to the department in which the part is to be machined, so that the operator may refer to the card if he wishes to refresh his memory regarding the designated operations. These cards,

type or model of machine for which the part is being made and that number combined with the figures 243 following the hyphen indicates the part number.

The first three special tools listed are borrowed for the job from some

PART NO. 470-243		NAME	Friction Gear	M	LOT
B.P. D-40954 | MATL. A-2-3 | R-WT 17.0 | F-WT 11.75 | ORDER NO.		PCS. IN LOT			
DEPT.	OPER.	Drop Forging	OPERATION	CLASS 4	TIME
					STD. SET-UP EQUIP.
BS	Deliver				
LC	1	Chuck turn, bore, ream rough taper and face	*E	.642 .325	T2ACR
	2	Turn & face other end	*E	.190 .150	T2ACR
AC	3	Rough cut gear (2 at a time)(3 machines)	*E	.296 .40	GAE
	4	Cut gear (2 at once)(Finish)(3 machines)	*E	.319 .50	GSHA
D	5	Drill holes	*E	.040 .25	DS1A
HT	6	Heat treat (carbonized)			
TL	7	Second bore taper & face side	*E	.200 .50	T2ACB
BF	8	Burr	*E	.047 .00	Bench
HT	9	Heat treat			
	10	Brush clean			
G	11	Grind hole	E	.100 .25	GrII12B
A33	12	Press in Bushing (470-18)	E	.100	PRSA
	13	Drill all holes in bushing	E	.040 .25	DS1A
	14	Cut oil grooves	*E	.070 .15	Bench
G	15	Grind hole & face	*E	.084 .30	GrII12A
L	16	Finish bore taper	*E	.200 .25	LC16A
SR	Storage				
DATE	4-15-37	EIN: VI.			
	1-22-37 APPROVED	EIN: BLF	THE WARNER & SWASEY CO.		

AT LEFT
FIG. 2

THE Operating Sheet has a list of all of the operations on the piece, from start to finish.

• • •
TOP RIGHT
FIG. 3

SPECIAL tools required for the operations on any piece are designated on this Special Tool Record.

• • •
LOWER RIGHT
FIG. 4

TOOLS for each job are requisitioned on the Tool Order, shown at right.

tools for the numerous machine jobs and for the systematic handling of tools between the tool supply department and the machinery departments. Tools required for each sub operation and the sub operations in sequence that are performed in machining the piece are listed on set-up cards. These cards are made in triplicate, one white copy going to the tool supply department, a blue copy to the

5 x 8 in. in size, are filed in a card index in their respective departments.

As an example of the operation of this system, Fig. 1 shows the set-up card for a friction gear. On this form is listed the part number, the operations and the number and kind of tools required for the operations specified at the top of the card. The figures 470 in the space for the part number indicate the

other job, this being indicated by the figures 126 symbolizing the part number. The fourth item in this list of special tools contains the figure 243, showing that a limit snap gage is provided for this particular job. The hyphenated single figures indicate the tool numbers. The location of these tools in the storage bins is indicated at the right.

In the lower part of the card are

SPECIAL TOOL RECORD					CARD NO. _____
PART No.	470-243	NAME OF PART		Friction Gear	
DATE	KIND OF TOOLS AND HOW USED	TOOL No.	LOCATION	TRACING NO. DRAWING NO.	OTHER PARTS USED ON
3-22-26	Chuck Jaws	470-126 6	7F-22	D-29075	
"	Facing Tool	470-126 7	"	-	
"	Taper Tool	470-126 8	"	-	
"	6.495 to 6.500 Johnsson Adj.				
	Limit Snap Gage	1	7F-22	-	

listed standard tools used in making the friction gear, these being designated by arbitrary numbers.

On the reverse side of the set-up card are listed the successive sub-operations on the piece, together with speeds, surface ft. per min., feeds and scheduled time for the job.

The tool design department and the standards and methods department determine the methods for machining a piece and the latter department makes up an operating sheet for each part. The operating sheet reproduced in Fig. 2 has a list of all operations on the piece from the time the stock, in this case a drop forging, is delivered to the department until the finished part goes to storage. Operation one, the first item on this operating sheet, chucking, turning, boring, reaming, rough tapering and facing the end, has the various sub operations listed in detail on one side of the set-up card, Fig. 1. A blueprint of this sheet goes to the foreman of the department together with a blueprint of the detailed

drawings. This operating sheet follows the job through the plant.

When a special tool is designed a new tool record is made up by the shop tool designing department and kept in that department. Fig. 3 shows the special tools required for the friction gear, these items being transferred to the tool set-up card.

When the machine is about ready for a new job the foreman phones an attendant in the tool supply department and gives him the part number and operation number for which he wants tools. Thereupon the attendant from his copy of the tool set-up card for that job and operation makes up a list of the tools needed on a tool order sheet. On this sheet, Fig. 4, are provided columns for listing the department number, workman's number, part number; operation number, operation, the time the tools are ordered and delivered. From this sheet the attendant makes up a list of the tools required on a small slip made in duplicate, one copy of which is filed in the tool supply department and the other accompanies the tools and is returned with them when the

job is finished and the tools are brought back. On their return the duplicate slip on file is destroyed.

When tools are requisitioned they are gathered together, placed on skids and trucked to the department where wanted, staying on the skid, except when they are being used, until they are returned to the tool supply department.

Most machine shops do their tool maintenance work in their tool rooms. The Warner & Swasey Co. is convinced by experience that dependence on the tool room for tool maintenance is not as satisfactory as it should be and that the methods it has adopted not only for the maintenance of tools, but also for their storage is of advantage to both the production and sales organization. It is found to be a benefit to the sales organization, because the tool room can centralize activities more largely in making special tools (turret lathe tools and attachments) which the company makes as original equipment in the tool room to meet customers' requirements.

Graphitic Steel

(Fabrication, Heat Treatment, and Application to Dies and Punches)

BY G. A. STUMPF
AND F. R. BONTE

Timken Roller Bearing Co.



THE new graphitic steel is a high-carbon steel in which a substantial part of the carbon is present in the form of free graphite when the steel is ready for machining. As now produced, the basic analysis of this steel carries approximately 1.50 percent total carbon and approximately 1 percent silicon. It is an electric furnace product, made under rigid control. Ingot size and stripping temperature play an important part in the successful production of this material, for once an excessive amount of free graphite has been precipitated, heat treatment will not restore forgeability to the steel.

As rolled, but before preliminary heat treatment, graphitic steel is a hyper-eutectoid material composed of pearlite and free cementite with the possible appearance of finely divided free graphite. Ordinarily only approximately 20 percent of the total carbon will appear as free graphite in the steel in this condition, dispersed so finely throughout the steel that no pockets or definitely defined graphitic areas will be noticed.

The high silicon content of the

steel renders the carbide phase unstable, allowing the cementite to be broken down into ferrite and free graphite. For most machining operations, graphitic steel is normalized and annealed. This reduces the combined carbon and pre-

cipitates part of the total carbon in the form of graphite, uniformly distributed in minute pockets throughout the steel. The pearlite typical of an annealed structure is spheroidized to the degree normally associated with good machining qualities. Fig. 1 illustrates this condition at 100 and 1000 diameters. Experience indicates that this material machines practically as easily as gray cast iron.

THERE are many fields where a metal combining the free machining qualities, high resistance to wear and good frictional properties of cast iron with the uniformity, ease of hot or cold working, ready response to heat treatment, and good physical properties of steel, would be of value. This is particularly true of the die industry. Timken's new graphitic steel apparently combines these qualities, and is now available for both water and oil hardening applications in the die field. This article describes the steels physically, and presents information on the fabrication of dies and punches and their heat treatment.

Two types of graphitic steel are now being made. That used for water hardening applications is known as Graph-sil. For oil hardening applications, or where distortion must be held to an absolute minimum and where special toughness is required for the service, approximately 0.25 percent of molybdenum is added to the specification, this steel being called "Graph-mo." Preliminary and final heat treatments depend upon the application for which the steels are to be used.

Care must be exercised in the processing of graphitic steel to control graphitization, for once the graphitic pockets are established they are permanent unless forged together. The degree of graphitization can, however, be largely con-

trolled by the annealing treatment. Consequently, material which is to be forged to shape is worked from the "as rolled" condition, where a high percentage of combined carbon exists, in which state it can be hot worked very satisfactorily if reasonable care is exercised in keeping the temperature of the piece between 1700 deg. and 2000 deg. F. A light annealing treatment must be applied to Graph-mo as it comes from the mill before it can be sawed, but this treatment is carefully controlled to avoid graphitization.

microstructure developed in the material. This in turn depends on the heat treatment, which controls the amount of combined carbon. A typical set of values for both Graph-sil and Graph-mo is presented in Table I.

Although the exact heat treatment depends upon the service to which a die or punch is to be subjected, enough experience is now available to justify certain general rules. These of course are subject to modification to meet specific cases, but the following outline for the heat treatment of Graph-sil

it may be dropped in oil for the final cooling. The length of time such a punch should be held in the quenching bath depends of course upon the section, but any good hardener can gage his quenching time by the rate at which the piece dries when raised out of the brine.

Experience shows that when working with graphitic steel the die or punch should be held at heat for at least 1 hr. per in. of section before quenching and that the drawing operation should provide at least 4 hr. at heat per inch of section. Time at heat is particu-

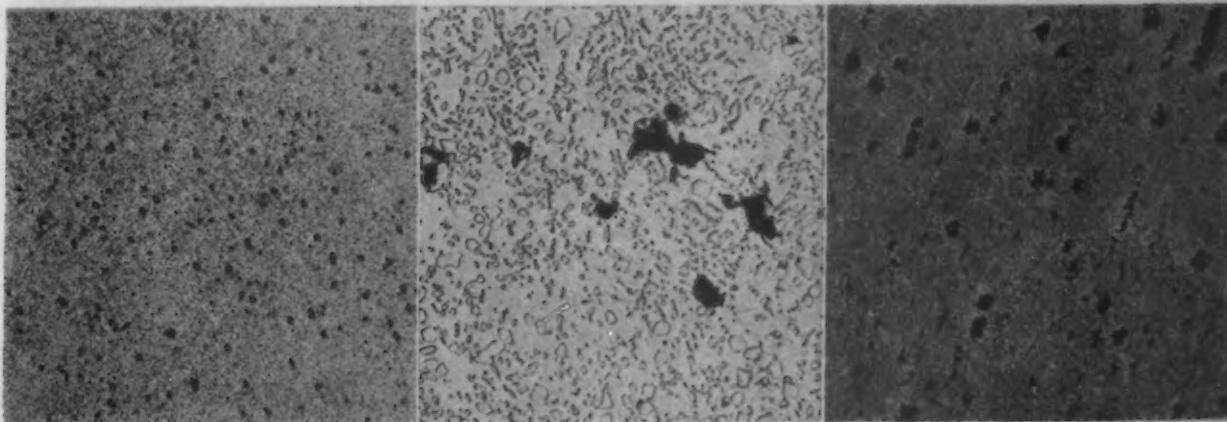


FIG. 1—(Left) Microstructure of annealed and normalized Graph-mo in condition for machining, at 100 diameters; (middle) structure of annealed Graph-mo at 1000 diameters; (right) structure of hardened Graph-mo after quenching in water from 1475 deg. F., at 100 diameters.

• • •

Material for machining, however, should be normalized and annealed to secure best results. Thus, billets of Graph-sil for forging into dies are shipped in the "as rolled" condition and Graph-mo billets are only softened enough to permit cold sawing. All stock which is to be machined to shape is shipped only after normalizing and annealing, regardless of whether it has been forged to shape or is still in the bar or billet form.

Heat Treatment

The graphite particles present in graphitic steel after normalizing or annealing are utilized in the final heat treating and hardening processes. When steel of this type is held at heat above the carbon change point, part of the graphite is absorbed, but the pockets remain the same. Quenching develops a martensitic structure, the material reacting in much the same manner as does a eutectoid tool steel. This structure is clearly evident in a photomicrograph shown in Fig. 1.

Physical properties of graphitic steels are closely related to the

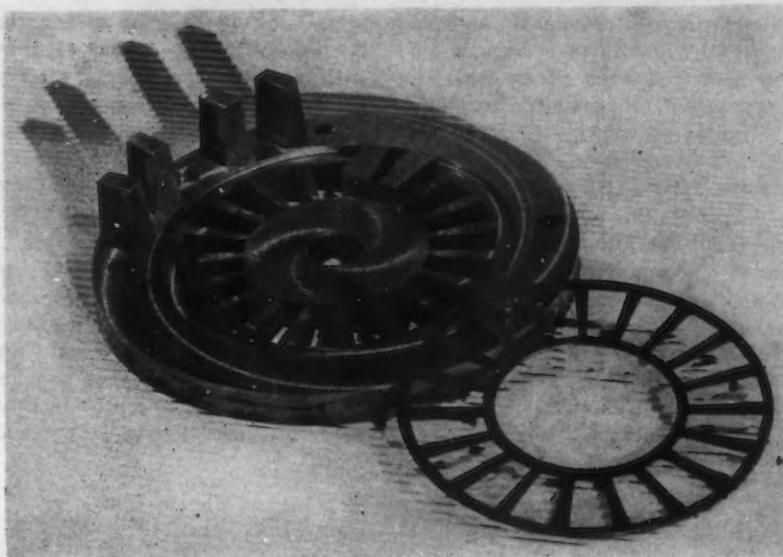
and Graph-mo dies and punches is based on practical experience over a considerable period of time and in a number of plants.

As a general rule, blanking and forming dies or punches made from Graph-sil, or water hardening graphitic steel, should be quenched in water or brine from 1550 deg. F. and drawn at 300 deg. F. Punches of this nature have been used on material up to $\frac{1}{8}$ in. thick with uniformly good results. A particular punch of this type should be quenched to a depth just below the first undercut and held in the brine until it reaches a temperature of 300 deg to 400 deg. F., after which

larly important in both instances and any attempt to reduce the minimum here given has resulted in unsatisfactory results.

I.D. punches should be treated in the same manner except that the hole should be plugged and the punch should be immersed in the brine just past the working surface. I.D. dies such as are used for shaping cages, brake drums, etc., can also be quenched in brine from 1550 deg. F., transferred to oil and drawn at 300 deg. F., developing a hardness of 62 to 63 Rockwell C. The larger the section, the more important it is to be sure that ample soaking time at least is provided.

Ordinarily Graph-sil dies and punches are quenched in water or brine, but in the case of certain types of draw rings or blanking dies it is advisable to quench in oil where the O.D. is less than 4 in., as they are likely to crack if made too hard. Quenching such a ring in oil from 1600 deg. F. and drawing it at 300 deg. F. for 4 hr. per in. of section will develop a hardness of 58 to 60 Rockwell C. Where larger rings are concerned, the



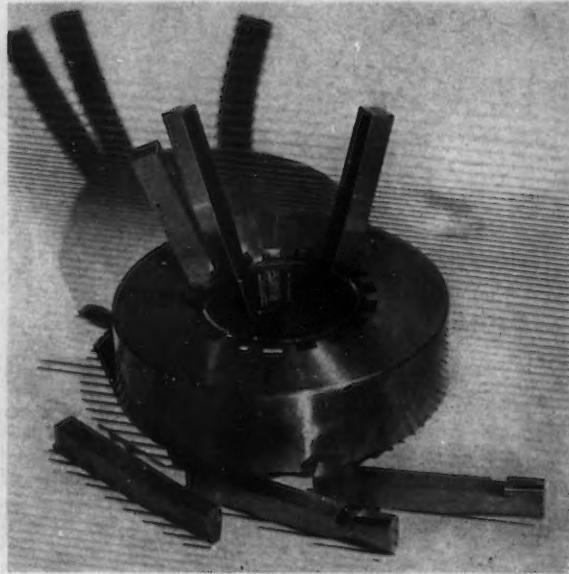
ABOVE

FIG. 2—Perforating die and punches made of Graph-mo and used for making cages for Timken flat type thrust bearings.

• • •

AT RIGHT

FIG. 3—Multiple punch and die assembly used for coining or "winging" bearing cage pockets to conform to the contour of tapered rolls.



greater mass of metal permits such units to be quenched in water from 1550 deg. F., cooled in oil and then drawn at 400 deg. F., for a hardness of approximately 60 Rockwell C. Care should be exercised whenever water is used for quenching not to keep the ring in the tank too long, transferring it to the oil bath for cooling just as soon as the proper quenching action has been secured.

Graph-sil requires some care in quenching, but the tough non-warping Graph-mo has proved to be easy to handle and highly satisfactory for dies and punches. One blanking punch used at Timken, for example, was made of Graph-mo, quenched in circulating oil from 1475 deg. F. and then drawn at 300 deg. F. This treatment produced a file hard punch, the working face being 63 to 64 Rockwell C. With this non-warping steel it is seldom necessary to use special quenching fixtures, drop quenching being ordinarily all that is needed.

Sizing dies operate under high pressure and it is essential that the working surface be very hard while the body of the die is tough. Consequently they should be quenched on a fixture, any bolt holes being plugged with asbestos and the sides protected. For small dies best results will be secured by concentrating the flow of coolant through the hole in the die. On large dies it is necessary to quench the whole die under a fountain. In either case the working surface should be file hard, tests showing that by quenching from 1550 deg. F. into brine and drawing at 300

deg. F. a hardness of 63 Rockwell C is developed. Soaking and drawing times should be based on the same schedule as previously listed.

Perforating units used in multiple dies at the Timken plant for perforating the pockets in bearing cages are made of Graph-mo. These punches, which are used on strip steel up to 3/16 in. thick, are giving constant high speed service. The graphitic steel parts, after having been machined and ground to size and shape are heated to 1475 deg. F., held at heat for 1 hr. per in. of section and quenched in circulating oil. Following the quench they are drawn at 700 deg. F., holding them at heat for 4 hr. per in. of section to assure uniformity of structure throughout. This treatment develops a surface hardness of 52 to 54 Rockwell C

which, while not file hard, has been found to give the most satisfactory results in service. Fig. 2 shows a die used for perforating the flat cages used in thrust bearings, which was treated in this manner.

Multiple punches such as will be seen in Fig. 3 are used in the Timken bearing factory for coining or "winging" the edges of cage pockets to conform to the contour of the rolls. As cages are made from strip steel up to 3/16 in. thick, the die wings and punches must be file hard and withstand both heavy pressure and shock, retaining their sharp edges and smooth faces during long production runs. Experience shows that for dies and punches subject to service of this

nature the oil hardening Graph-mo gives excellent results when quenched from 1475 deg. F. and drawn at 300 deg. F. to a hardness of 63 to 64 Rockwell C. At least 4 hr. at heat should be allowed per in. of section in drawing Graph-mo coining dies and punches.

The center pins used for operating the multiple perforating or winging (coining) punches do not need to be as hard as the punches, but must be extremely tough and wear resistant, as any inequality on the operating face will affect the coined surface. Many times the former life of center pins has been secured in the Timken plant by using Graph-mo for these parts. High fatigue strength is secured with good wear resistance by quenching pins of this nature from 1450 deg. F. in oil and drawing

them for 4 hr. per in. of section at 500 deg. F., which develops a hardness of 55 to 57 Rockwell C.

Coining Punches

Heavy duty coining punches require a high drawing temperature, for toughness and freedom from chipping are essential. Graph-sil has been used at the Timken plant for coining $\frac{3}{8}$ in. strip (S.A.E. 1015 steel) with very satisfactory results. The largest punch used to date in the Timken plant for this purpose has an outside diameter of $2\frac{1}{2}$ in. It was held at 1550 deg. F. for 2 hr., quenched in brine at 80 deg. F. to a depth of $1\frac{1}{2}$ in., cooled in oil and then drawn at 650 deg. F. for 8 hr., showing a hardness on the working face of 55 Rockwell C.

Rolls for use on forming ma-

having been 30 in. in outside diameter. The smooth, wear resistant surface, free from pick-up or scoring, which features graphitic steel makes it particularly suitable for dies of this class. Successful applications are now on record where such dies have been used for forming both hot and cold rolled strip steel, aluminum, brass, copper and bronze and certain small parts made of stainless steel. As graphitic steel responds readily to selective quenching, fixtures and plugs may be used to good advantage in quenching forming dies made from it.

Where the hole in the die is under $\frac{1}{4}$ in. in diameter, experience shows that it should be quenched from 1500 deg. F. Larger dies should be quenched from 1550 deg.

F., all sizes being quenched in brine at approximately 80 deg. F. and transferred to oil for cooling. Tests show that a hardness of 63 Rockwell C results from such drawing these parts at 300 deg. F. and service records show remarkably long runs before these dies need either polishing or regrinding.

Cold header dies present many problems to die manufacturers and users. Graph-sil has been used successfully for making dies for rivets, cold formed from S.A.E. 3120 steel rods, up to $\frac{1}{2}$ in. in diameter. These dies are quenched in water on a fountain from 1450 deg. F., cooled in oil and drawn at 525 deg. F. to a hardness of 55 to 57 Rockwell C being held at that temperature for 4 hr. per in. of section. In making dies of this nature the quenching water should be directed through the hole or into the pocket, the outside of the die being protected when necessary. The hardness developed depends on the drawing temperature, increasing as the drawing temperature is reduced.

File hard faces can be secured on Graph-sil forming dies and punches such as are used for flaring tube ends by quenching them from 1600 deg. F. in oil and drawing them at 300 deg. F.

Twist guide rolls in a continuous bar mill are subject to severe service combining shock with intermittent high temperature and water sprays. A test installation using Graph-mo rolls has already given several times the life formerly expected and apparently will prove highly satisfactory. The new

(CONTINUED ON PAGE 85)



FIG. 4—Forming rolls and die used for making fan pulleys from strip steel.

chines for shaping bicycle rims, truck wheel rims, moldings, pulleys and other irregular shapes from strip steel have been successfully made from Graph-sil. These rolls should be quenched in brine from 1550 deg. F., transferred to oil for cooling and drawn at 300 deg. F., developing a hardness of 63 to 64 Rockwell C. Experience to date indicates that rolls of this character, such as are shown in Fig. 4, will last from two to four times as long as the tool steel rolls formerly used and that they show a remarkable freedom from pick-up.

Forming dies have been made from this same material in a wide range of sizes, the largest to date

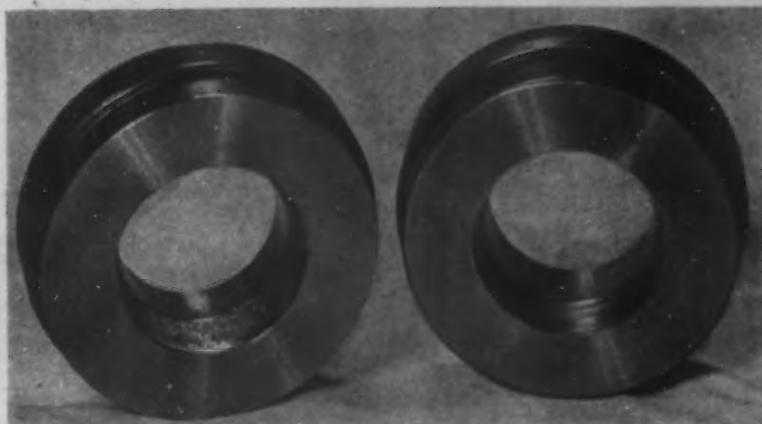


FIG. 5—Comparison between tool steel and graphitic steel dies. The tool steel die on left made 10,000 pieces, and the graphitic steel die on the right made 309,000 pieces.

Packard Accuracy Begins in

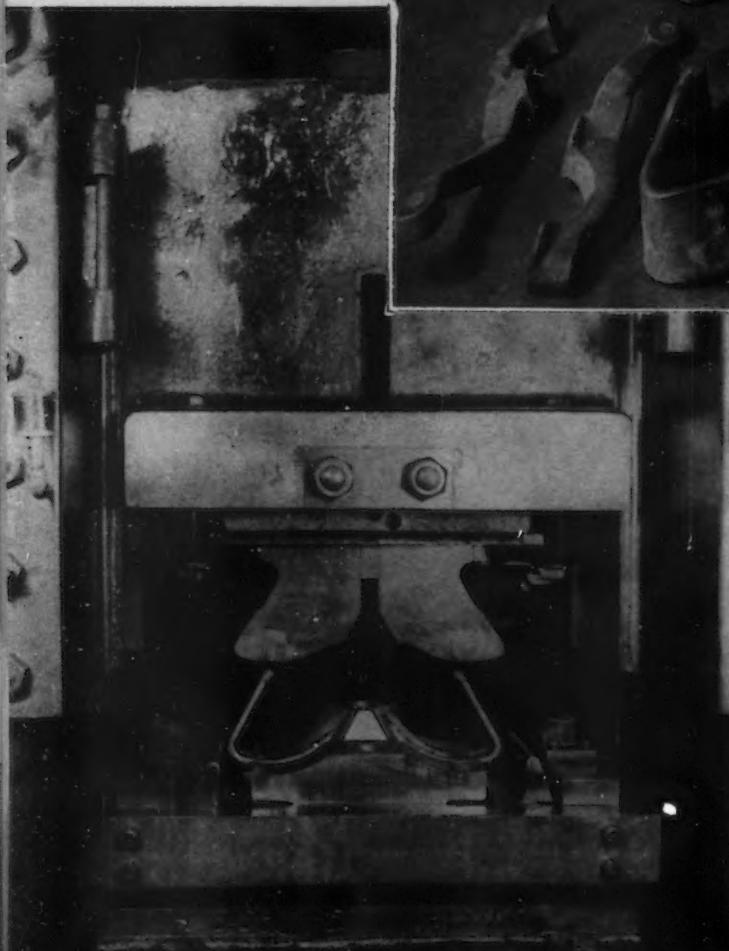


A GREAT many shops overlook the economies that can be effected in overall manufacturing costs by more careful attention to forge shop technique. Hence it is refreshing to visit a plant where the forge shop superintendent looks upon his department as a step in the process and not as an

end in itself. At the Packard Motor Car Co., Detroit, the same ingenuity and initiative is exhibited in this department as is found in the machine shop and assembly departments of most other establishments. Because forging is the first step in the process, it is apparent that close control of size and shape, as well as cost, of forg-

ings is bound to result in economies later on. Packard pays a great deal of attention to the shape and weight of the blank with the idea of holding scrap losses in the flash to minimum and has gone in extensively for coining operations as the final means for accurate sizing cold. Nor are any of the in-between steps overlooked. Innumerable

• • •
SOME typical Packard forgings that are accurately sized at key points by coining. For example, on the steering knuckle lever at the left, the bolt seats in the knuckle face and drag link fastener are coined at right angles within 0.005 in. on angularity. The central pieces are front door hinges.
• • •



• • •
FRON'T door hinges are formed cold from flat stock in pairs. The initial bend is made in a simple crank press. The final bending operation, illustrated, is performed in a 1000-ton Toledo knuckle-joint press with cam bending die and hydro-pneumatic cushion in the bed. The hinges obviously must be pulled off the upper forming die toward the operator.

• • •

ways have been found to cut costs and improve quality, generally through the use of modern machinery.

Packard has made a studied effort to reduce the relative flash weight of its forgings. For example, the flash on one piece was averaging 35 per cent of the original billet weight. Through the use of mill rolled blanks, the flash was reduced to 23.8 per cent. In place of a billet weighing 14.13 lb. was substituted a rolled blank weighing 11.14 lb. and the finished forging was reduced from 9.13 to

the Forge Shop

By FRANK J. OLIVER
Associate Editor, The Iron Age

9.00 lb., thereby lessening the amount of material to be removed in the machining operations. The

morning and twice in the afternoon, largely to check die wear. If any doubt exists, the rods are re-

checked by a fluid displacement method, one half at a time.

Careful production records are

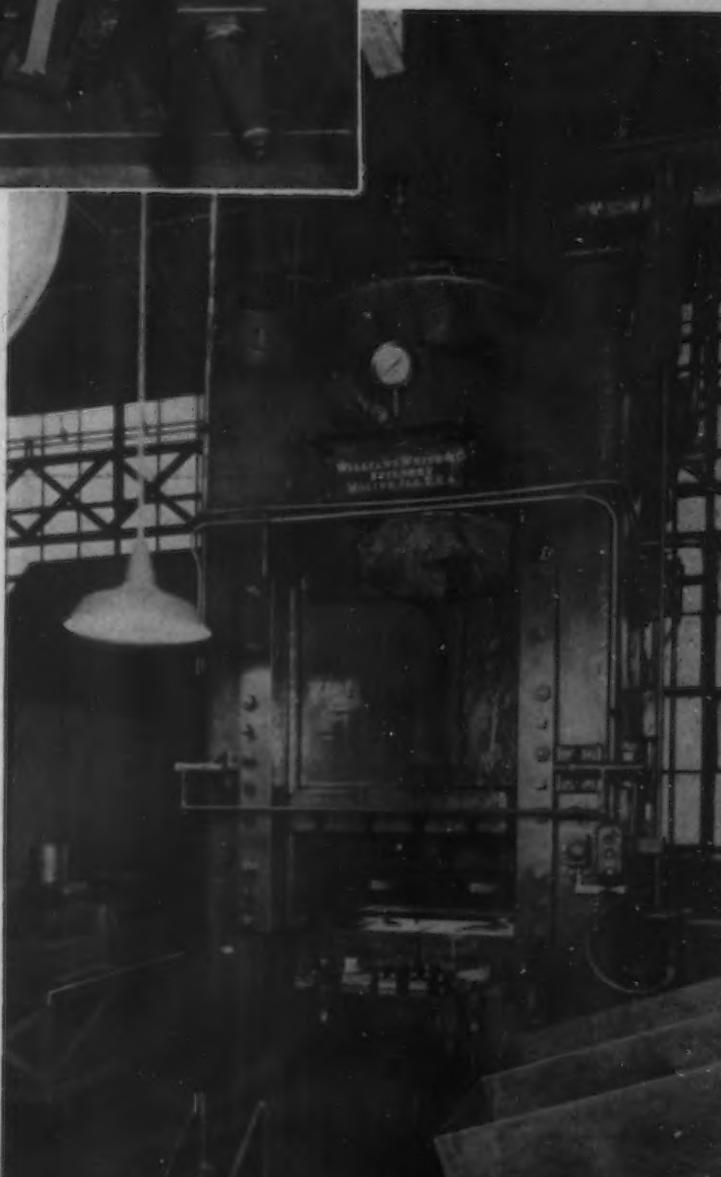


work piece is more accurate and the die life has been improved. Fewer blows are required since a large amount of initial blocking is eliminated by the use of rolled blanks, and the work of extruding the flash is reduced, besides speeding up the operation.

Some forgings are made with no flash at all. This is true of transmission cluster gears and clutch shafts formed on horizontal forging machines. Elimination of flash is achieved by careful trimming of the bar stock to within 1/16 in. of the theoretical size. Some forgings are made with no draft, which cuts down their weight. To accomplish this, the parting line in the die is made to run diagonally through the cross-section of the piece. In effect a very wide draft is produced on each side, but the opposite sides are in opposing die halves.

A great deal of attention is given to connecting rod forging weights. Rods coming off each hammer are weighed both ends twice in the

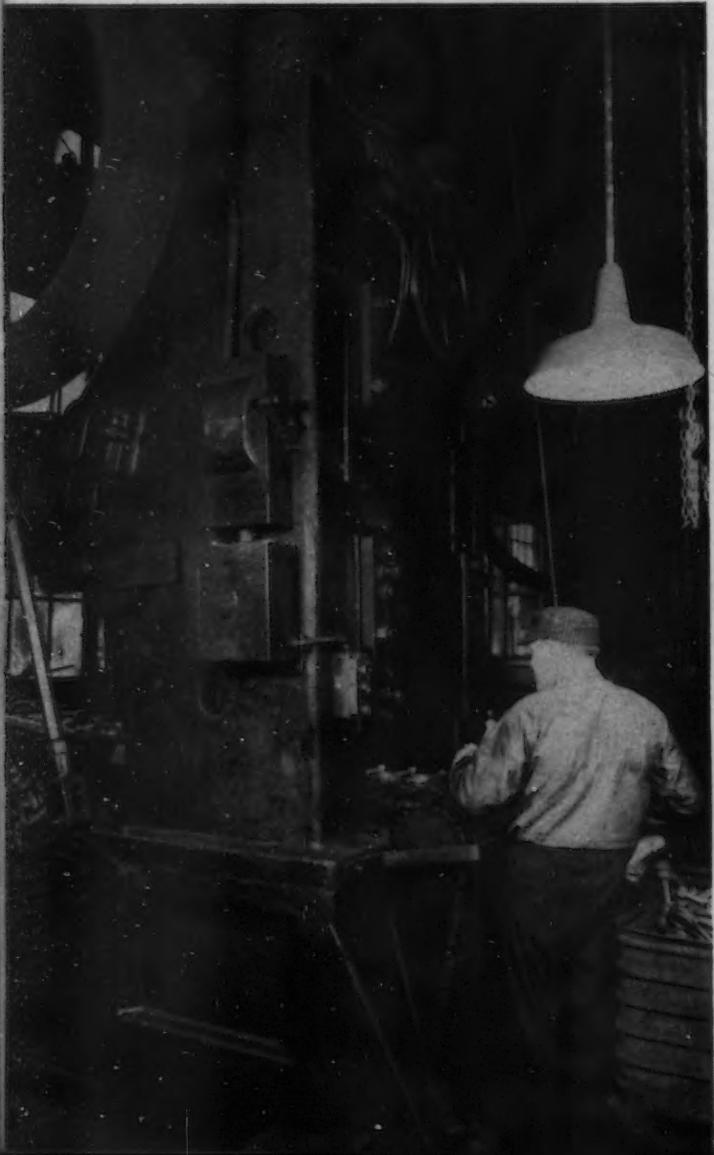
IN this 1000-ton Williams - White hydraulic press, the door hinges are placed on edge and coined on the locating points for subsequent machining operations. This press is a double-action type with a time delay incorporated in the hydraulic cycle to provide a dwell sufficient to set the metal.



FRONT door hinge brackets receive a 100 per cent check after coining. Angle gages check the slope of the curved section, which has limits of $\frac{1}{2}$ deg. to prevent interference with the door action. The hinge pad proper is checked for flatness and angularity at four points. In a separate, step gage the width is checked within a tolerance of 0.010 in.



ELABORATE gages are used to check the more intricate forgings, such as this pair of front wheel support arms. The fixture corresponds to that employed in the first broaching operation. Since no machining is done on the spring pads, they are checked at four points with step gages having $1/32$ in. limits. These pads have been restruck cold under a steam hammer, whereas the ends of the shock absorber link connections have been coined preparatory to drilling and reaming.



AT LEFT

COINING of connecting rods is an automatic operation carried on in this 800-ton knuckle-joint Minister press. All the operator needs to do is place rough forgings on the lower die platen and let the slat conveyor pull them into the die cavity. The intermittent motion of the conveyor is synchronized with the press stroke, through crank drive off the back shaft.

• • •

AT RIGHT

LAUGE savings in flash weight, and hence scrap losses, are possible through the use of rolled blanks in place of billets. Besides, the forging can be brought more closely to final size, with resulting saving in machining time and scrap chips. Die life is lengthened because of fewer blows required and less work needed to extrude the flash in the dies.

maintained on all dies as a check on die life. Dies for connecting rods now have lives of better than 20,000 pieces, with an occasional set running up to 28,000 pieces, where before 5000 pieces was an average run. This is but a rough check, of course, since forgings vary in weight from piece to piece even in a short run, so that it comes down to a measure of the percentage of pieces that are running oversize, taken in consideration with the surface defects, if any, of the die. The limits set on connecting rods, for example, are arbitrarily set at plus or minus $5/16$ oz. on the small end and $\frac{3}{4}$ oz. on the large end.

Die Material Standardized

Packard has standardized on a die material roughly of the following composition:

Carbon	.....	0.50-0.60	per cent
Nickel	.....	1.25-1.75	" "
Chromium	..	0.50-0.75	" "
Molybdenum	0.10-0.30	" "	
Vanadium	..	0.30	max.

Hardness runs between 52 and 55 Scleroscope. Cast alloy steel die blocks have been tried experimentally with some success, but have not been adopted as standard for any operation as yet.

Packard favors coining operations wherever practical as a means of holding forgings more closely to finished size and thereby



reducing machining time and chip scrap. Some of these operations combine cold forming and bending. Front door hinges, for example, are bent from the flat in pairs in two press operations and are then coined on edge. These operations are illustrated, with a detailed explanation in the captions.

Sequence on Front Wheel Support Arm

Shifter yokes are coined on the ends (flats) and in the half circle. Brake and clutch pedals are coined on the pedal pads. On the front wheel support arm, the shock absorber link connection is cold seated prior to being spot faced and drilled. The spring pad on the same piece, however, is restruck cold in a steam hammer. Faces of both the big and little ends of connecting rods are coined and straightened at the same time in a fully automatic press with conveyor feed. All the operator has to do is load the conveyor.

Steering knuckle levers are coined so as to bring the knuckle face and drag link fastener to within 0.005 in. on angularity of a right angle. Both seats for the fastening holes are coined parallel with the face.

The sequence of operations on one part, the front wheel support arm, is typical of Packard methods and will be described in detail to summarize the various tech-

BY having the parting line of the die run diagonally through the cross-section of the piece, it is possible to make the forging without draft, thus eliminating unnecessary dead weight. As far as the dies are concerned, there is a wide draft angle of 20 to 30 deg. on each side because of the tilt of the work plane.



AT RIGHT

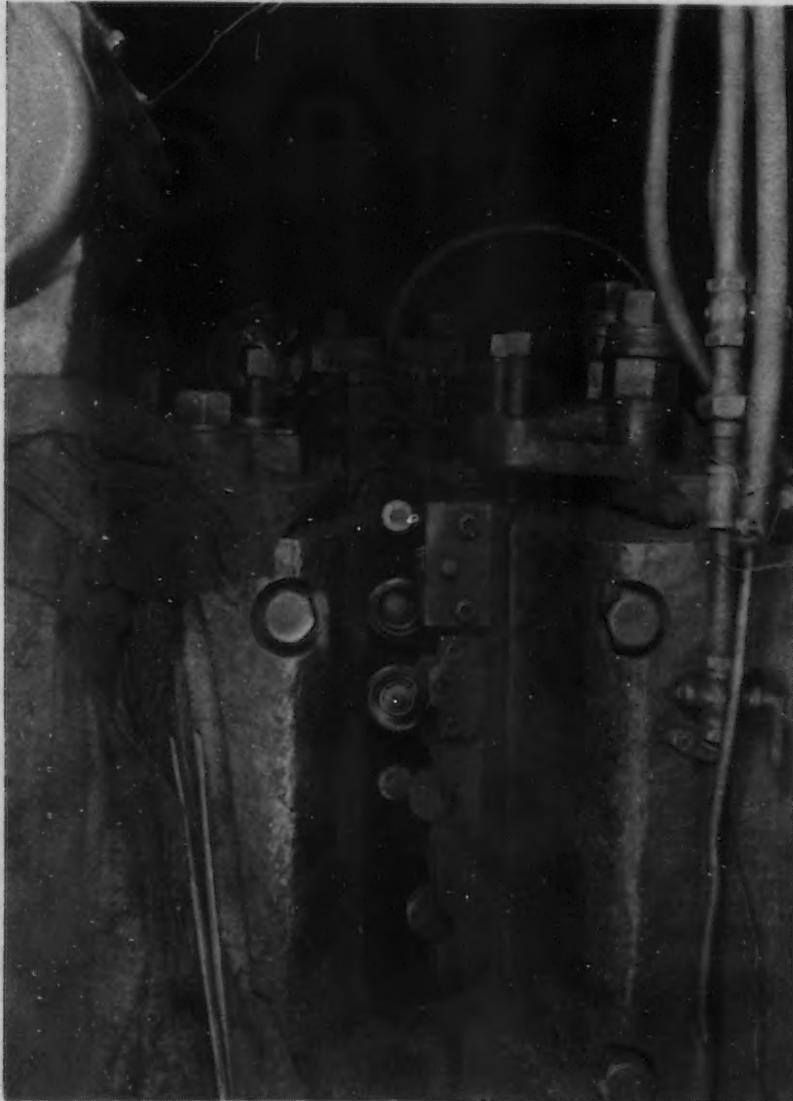
A NEW addition to the Packard forge shop is this Hagen oil-fired billet heating furnace. Twenty-seven cold sheared-billets for ring gear blanks are loaded at a time on the three V-rails. The control of the pusher is by pushbutton at the discharge door. Control of temperature is automatic by a "Rayotube" radiation type of pyrometer in which the thermocouple unit is mounted outside the furnace and receives its heat from a closed-end target tube in the heating zone.



niques employed. This is a rather large, heavy piece that includes the pad for the independent front wheel coil springs. It has several thin sections. The material, which is SAE 1040 steel, comes from the mill in the form of a rolled blank and after being heated in an oil-fired forge furnace, the blank is blocked and roughly shaped under an 8000-lb. steam hammer. It is then reheated so as to assure a uniform temperature for the final shaping in a second hammer and thus be sure of uniformity in the length of the cold forging. These hammers are recent installations and have been making some interesting production records. The flash is trimmed in a crank press and the piece is immediately re-struck to restore the shape and

correct any distortion resulting from the trim die. The forgings are now ready for heat treating and subsequent pickling.

These pieces, right and left hand, are coined at the shock absorber link connections. They are straightened, if need be to fit the gage, illustrated, which corresponds to the broaching machine fixture for the first machining operation. Through the aid of four spring backed step gages, the pad must check within a $1/32$ in. limit, since no subsequent machining is performed on this particular part of the arm. The overall length must check within $1/16$ in. Restriking cold is responsible for those limits, rather than coining which is limited to one end only, an end that is later spotfaced, drilled and reamed.



TWO auxiliary punches have been added to the slide of this national forging machine $\frac{1}{8}$ in. above the normal ram travel, making six impressions in all. By careful shearing of the steel blank within $1/16$ in. of theoretical size, flash is eliminated entirely. The piece is the clutch shaft of the transmission and is SAE 3115 steel. The transmission gear cluster is handled in the same way.

Mayari R



THE low-alloy structural steels now used in the construction of transportation equipment, to reduce weight and increase pay load, differs from the more familiar types of alloy steels, such as those of the S.A.E. series, in that they can be employed to advantage in the as-rolled condition. For a typical use see Fig. 1. Such steels, of which Bethlehem Steel Co.'s Mayari R* is an example, are used without heat treatment, except for the customary annealing of sheets, and their composition is selected to produce a material that will not harden appreciably in rapid cooling. Thus, thin sections and welds, or the steel adjacent to welds, do not harden and require no heat treatment with its resulting reflection in cost. Although the strength of such steels is appreciably higher than that of ordinary structural steel, it must not be excessively high, because the difficulties of fabricating becomes too great as the steel gets too strong and hard. An ideal material, considering both strength and ease of working, is a steel with minimum yield point of 50,000 to 55,000 lb. per sq. in. and minimum tensile strength of 65,000 to 75,000 lb. per sq. in.

In order that full advantage may be taken of the higher strength, a low-alloy steel, for most applications, must also have a much greater resistance to atmospheric corrosion than a plain steel. Otherwise, as equal exposure would result in equal loss in section for both steels, structures fabricated of the higher tensile variety would naturally suffer a far greater loss in strength than would the plain steel.

*Pronounced MY-ree; R denotes rust resistance.

(A Corrosion Resistant, High Strength Steel)

By R. S. A. DOUGHERTY
Bethlehem Steel Co.

The composition of Mayari R steel was selected to produce a steel of the following properties: (1) A strength appreciably in excess of ordinary structural steel; (2) good hot and cold-working properties; (3) good welding characteristics; (4) little tendency to harden on rapid cooling; and (5) great resistance to atmospheric corrosion.

To attain such a combination of properties it is necessary that the carbon content be held low and that the increased strength be brought about by elements other than carbon. The carbon content of Mayari R has therefore been fixed at approximately 0.10 per cent, and the desired strength and corrosion resistance are obtained by addition of nickel, chromium, manganese, silicon, copper and phosphorus.

Extensive work on steels of the Mayari type has indicated that steels within the following ranges of composition, which belong to the Mayari R classification, have a minimum yield point of 50,000 lb. per sq. in., a minimum tensile strength of 65,000 lb. per sq. in. and meet the other requirements: 0.08 to 0.20 C, 0.50 to 1.00 Mn, 0.04 to 0.12 P, a maximum of 0.05 S, 0.05 to 0.50 Si, 0.20 to 1.00 Cr, 0.25 to 0.75 Ni and 0.50 to 0.70 Cu.

Test Heats Studied

In order to investigate the merits of this steel, typical open-hearth heats were made with a variety of products to determine the ease of fabricating and the properties of the fabricated products. Observations and results of tests on two of these heats, which will be designated as Nos. 1 and 2, are given in the following paragraphs.

The analyses of the heats were as follows: (No. 1) 0.08 C, 0.45 Mn, 0.099 P, 0.035 S, 0.10 Si, 0.34 Ni, 0.25 Cr, and 0.50 Cu; (No. 2) 0.08 C, 0.72 Mn, 0.100 P, 0.042 S, 0.40 Si, 0.33 Ni, 0.56 Cr, and 0.62 Cu. The composition of heat No. 1 is particularly suitable for sheets, which is one of the most important applications of steels of this type. No. 1 is also used for thin plates and rivets. Analysis No. 2 is designed for products such as heavy plates, bars and structural members.

The steels were fully deoxidized and poured into hot-topped molds, slab ingots and mill ingots being cast from each heat. The slab ingots were rolled into slabs and then into plates, the mill ingots into blooms and billets for subsequent fabrication into a variety of products. Slabbing and blooming offered no difficulties and the surface of both slabs and blooms was excellent.

Blooms of the softer steel, No. 1, were rolled into sheet bars and then into sheets of various gages. No.

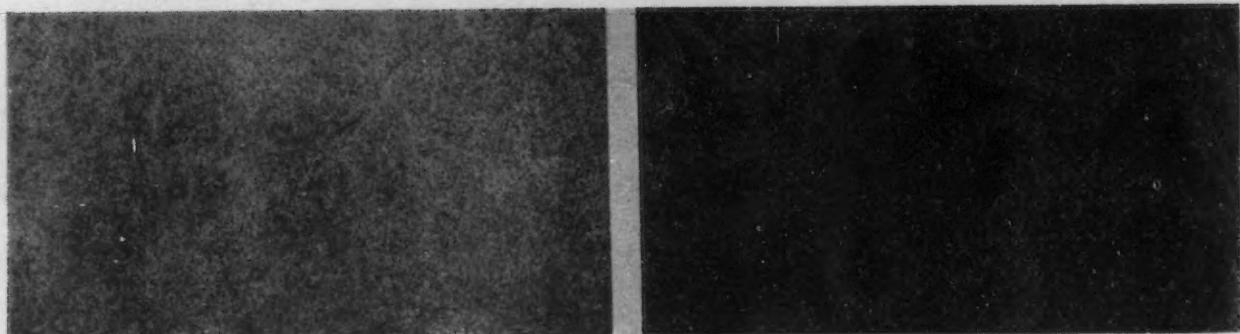
TABLE I
Tensile and Bend Tests for Analysis No. 1 (16 Gage Sheets)

Treatment	Rolling Direction	Yield Point, Lb. Per Sq. In.	Tensile Strength, Lb. Per Sq. In.	Elongation, Per Cent		Flat Bend	Rock- well F. 60 Kg. and ½-In. Ball
		In 2 In.	In 8 In.				
Blue anneal	L	55,300	68,100	30.0	20.0	OK	....
Blue anneal	T	57,400	76,600	34.0	21.0	OK	....
Blue anneal and P. L.	L	54,500	71,900	34.0	19.5	OK	100.6
Blue anneal and P. L.	T	54,000	71,000	35.0	21.5	OK	....
Blue and box	L	49,300	67,500	33.0	19.0	OK	98.8
Blue and box	T	50,700	68,800	32.0	20.5	OK	....
Blue and box and P. L.	L	53,000	65,500	30.0	22.5	OK	98.2
Blue and box and P. L.	T	55,200	69,200	30.5	21.5	OK	....

Blue annealed = normalized at over 1700 deg. F.; blue and box = forging anneal followed by box annealing; P. I. = patent (stainless) Inoxed.

TABLE II
Physical Properties of Plates From Mavari R Steel

Physical Properties of Plates from Mayntz & Steel								
Thickness, in Inches	Direction of Rolling	Yield Point, Lb. Per Sq. In.	Tensile Strength, Lb. Per Sq. In.	Elonga- tion in 8 In. Per Cent	Reduc- tion of Area, Per Cent	Brinell	Bend	
		Steel No. 1	Steel No. 2	Steel No. 3	Steel No. 4			
1/8	L	57,600	71,900	28.0	66.3	137	Flat	
1/4	L	52,350	68,600	30.0	61.4	131	Flat	
5/16	L	63,000	81,900	20.0	62.9	163	Flat	
3/8	L	66,200	81,900	28.0	64.7	156	Flat	
7/16	L	58,200	78,400	28.0	57.4	156	Flat	
1/2	L	54,900	78,400	25.5	60.6	152	Flat	
9/16	L	54,900	78,400	25.5	60.6	152	Flat	
5/8	L	50,000	75,200	30.0	52.1	167	Flat	



TOP

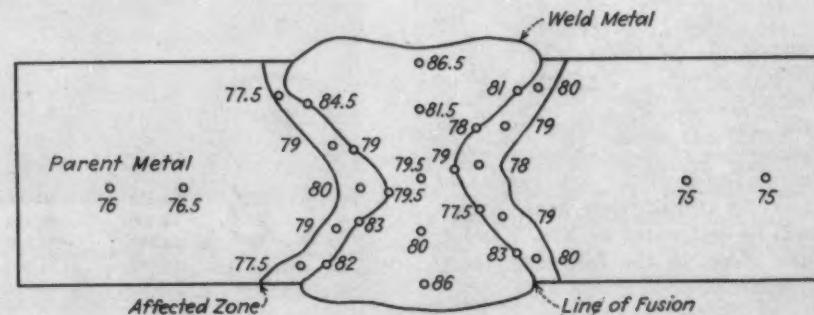
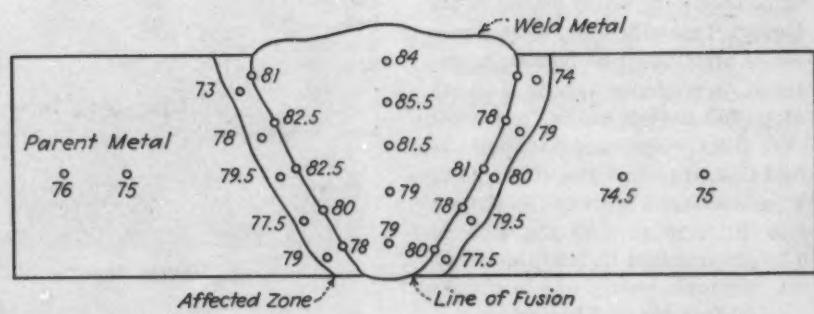
FIG. 1—An important outlet for Mayari R steel is in the construction of light weight passenger cars.

CENTER

FIG. 2—Mayari R steel (left) and ordinary steel (right) after more than two years' exposure to an industrial atmosphere. Tests indicate at least six times longer life for the former.

AT RIGHT

FIG. 3—Diagrams showing Rockwell hardness tests on welded plates of Mayari R steel: (Upper) $\frac{1}{4}$ -in. plate of steel No. 1, as welded; (lower) $\frac{1}{2}$ -in. plate of steel No. 1, stress relieved at 1050 deg. F.



difficulty was experienced in rolling, and the surface was good. Tensile and laboratory bend tests are given in Table I.

Sheared plates of various standard thicknesses were rolled from the two steels. The slabs were heated to the temperature usually employed for soft steel, and no difficulties were encountered in the rolling. Tensile properties, Brinell hardness, and bend-test results for the plates are given in Table II.

For both qualities the required minimum tensile strength and yield strength, 65,000 and 50,000 lb. per sq. in. respectively, are exceeded in all plate thicknesses. The ductility, judging by elongation and reduction of area, is also satisfactory in every case. Steel of any gage could be bent flat upon itself.

Photomicrographs of the $\frac{3}{8}$ -in. and $\frac{5}{8}$ -in. plates in the as-rolled condition revealed that the structure of Mayari R steel is practically indistinguishable from that of a low-carbon unalloyed steel. Izod impact resistances of longitudinal specimens from $\frac{3}{8}$ -in. plate were as follows: (No. 1), 82 ft. lb. in the as-rolled and 81 ft. lb. in the normalized condition; (No. 2), 80 ft. lb. in the as-rolled and 87 ft. lb. in the normalized condition.

Impact resistances of V-notched Charpy specimens from $\frac{3}{8}$ -in. plate at room temperature and at 32 deg. F. were also satisfactory both in as-rolled and normalized condition.

No difficulty was encountered in rolling Mayari R steel into structural members. The tensile properties of a 15-in. I-beam rolled from steel No. 2 were as follows: Yield point of 54,600 lb. per sq. in., tensile strength of 74,500 lb. per sq. in., elongation (in 8 in.) of 26.2 per cent, and reduction of area 57.0 per cent.

The surface properties were satisfactory.

Results from double shear tests on $\frac{3}{8} \times 2\frac{1}{4}$ -in. pan head rivets gave a tensile strength of about 75,000 lb. per sq. in. for rivets made from steel No. 2, practically the same as high-tensile manganese rivets (75,000 lb. per sq. in.). For rivets made from the softer No. 1 steel, the strength was about 61,000 lb. per sq. in. An interesting property of Mayari R steel is the high endurance limit. Endurance tests were made in the R. R. Moor machine on specimens taken from rivet bars; the endurance limit, as determined by 10,000,000 cycles, was

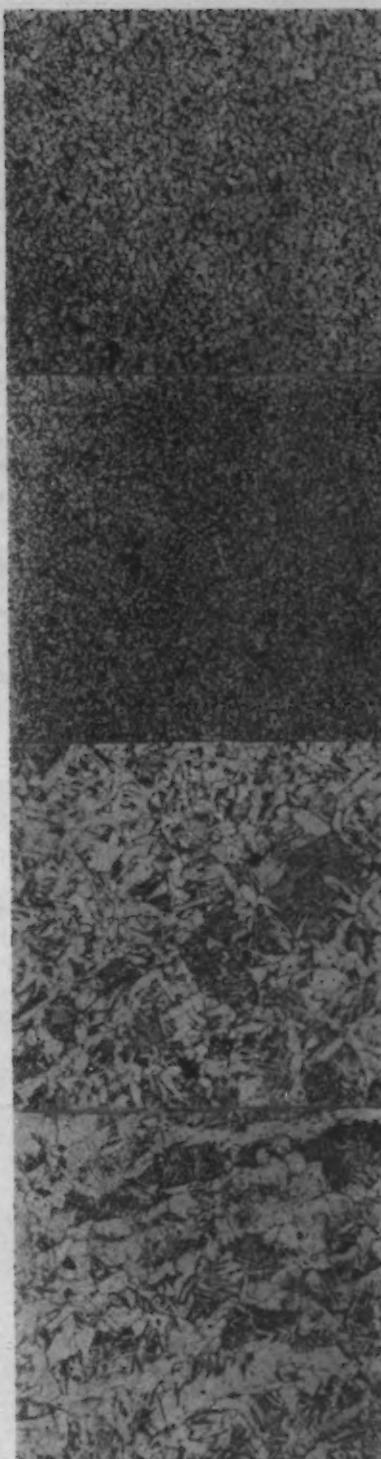


FIG. 4 — Photomicrographs of welds on Mayari R plate, at 100 diameters. Top to bottom: Parent metal (unaffected), affected zone, line of fusion, and weld metal.

found to be 49,200 lb. per sq. in. With a tensile strength of 75,200 lb. per sq. in. this gives an endurance ratio of 0.66, a very high value, typical of the low-alloy steels in which the hardening is produced by elements other than carbon.

Results of air-hardening tests on

$\frac{3}{8}$ -in. rivet rods are given in Table III; and data on a medium manganese steel have been included for comparison. The figures show that Mayari R steels have little tendency to air harden, even when air cooled from 1870 deg. F.

The work of planing, upsetting and forming $\frac{3}{8}$ -in. plate made from steel No. 1 to produce electrically welded pipe showed little or no difference from that of plain low-carbon steel. Acceptable welds were obtainable at high speeds.

It must be kept in mind that Mayari R steel cannot be formed and drawn as drastically as a dead soft steel, but otherwise no serious difficulties are encountered in fabrication. It can be worked hot and cold, and welds satisfactorily without air hardening.

Corrosion resistance is an important consideration in connection with a high-tensile steel. Obviously, a reduction in section as made permissible by the higher yield point would be of no advantage if the resistance to corrosion did not increase correspondingly. Otherwise the thin sections would scale off or pit through much faster than the thicker section of unalloyed steel.

Atmospheric exposure tests (see Fig. 2) of several years' duration made in industrial atmospheres at widely separated localities have all shown that the corrosion resistance of Mayari R steel varies somewhat in the different localities; this makes it impossible to say the latter steel is exactly "X" times as corrosion resistant as ordinary steel. All tests, however, definitely show that the corrosion resistance of Mayari R steel is far superior to that of even copper-bearing steel. In services where the life of copper-bearing steel would be twice that of ordinary steel it seems a conservative assumption that the life of Mayari R steel would be fully two or three times that of copper-bearing steel, or of the order of six times that of a plain steel.

Mayari R steel can be readily welded by any of the various processes, such as the electrical resistance method and by all of the fusion methods. However, like plain carbon steels, consideration should always be given to the preferred welding procedure which depends upon materials, designs, and the qualities desired in the welded joint for a particular service.

Under resistance welding the test

results of spot welding, seam welding and flash butt welding were very satisfactory; compared to soft auto body sheets the shear tests were proportionally higher, while the single spot twisting test naturally was lower. The test results indicate that Mayari R steels are entirely suitable for all types of electrical resistance welding.

A comprehensive program was also carried out with Mayari R steels to determine the effect upon the weldability of conditions such as the temperature of the parent metal (from 10 to 400 deg. F.), thickness of section, hardenability, and stress relieving subsequent to welding. Rockwell hardness figures for parent metal, weld, line of fusion, and affected zone are given in Fig. 3. Photomicrographs of typical welds on Mayari R plate are shown in Fig. 4.

Some of the important precautions in the welding of carbon steels also apply to Mayari R steel and are given here to emphasize the vital need for procedure control in fusion welding to obtain maximum benefits of Mayari R steels in their various applications: (A) When welding heavy sections preheating assists in reducing distortion; (B) assemblies must be carefully planned to permit free movement of parts in shrinkage or welded sections; and (C) struc-

TABLE III
Hardening Tests on $\frac{3}{4}$ -In. Rounds of Mayari R Steel

Treatment	Yield Point, Lb. Per Sq. In.	Tensile Strength, Lb. Per Sq. In.	Elongation in 8 In., Per Cent	Reduction of Area, Per Cent	Increase in Tensile Strength, Per Cent
Steel No. 1					
A	45,200	61,600	32.8	74.4	0
B	46,100	62,800	32.2	72.9	1.9
C	47,000	63,700	31.4	71.4	3.4
D	46,100	63,700	30.2	70.0	3.4
E	45,500	62,200	29.6	71.3	1.0
Steel No. 2					
A	55,300	73,400	29.7	71.0	0
B	46,300	74,000	30.0	73.7	0.8
C	47,600	74,650	29.7	73.7	1.7
D	55,300	74,600	28.7	72.9	0.8
E	49,300	75,000	28.2	74.0	2.2
Medium Manganese Steel*					
A	55,800	90,000	26.5	67.0	0
B	66,700	98,500	20.0	68.2	9.4
C	69,400	98,600	21.5	68.0	9.6
D	76,200	107,250	14.0	47.4	19.2
E	53,600	91,300	23.0	67.0	1.5

*Analysis: 0.33 C, 1.68 Mn, 0.025 P, 0.029 S and 0.21 Si. A = furnace cooled from 1385 deg. F.; B = air cooled from 1385 deg. F.; C = air cooled from 1560 deg.; D = air cooled from 1870 deg., and E = air cooled from 1870 deg., reheated to 1480 deg., and cooled in furnace—reheated to 1120 deg. and cooled in air.

tures must be stress relieved after welding when fatigue or dynamic stresses are present.

Mayari R steel may be welded with mild steel electrodes, and by adding reinforcements to the welds in cases where base metal strength is essential. A large number of

high-strength electrodes are also available for the low-alloy steels, which deposit weld metal of high strength. Some of these electrodes have alloying elements which produce weld metal with chemical analysis approaching that of the base metal.

THE bottom plate of a high-vacuum tank of a mercury arc power rectifier, which is one of a group being constructed for a large Eastern metallurgical plant, is here shown being ground down on a turntable at the Milwaukee plant of the Allis-Chalmers Mfg. Co. The size of rectifier for which this particular bottom plate was being prepared, will change up to 5000 amp. of alternating current into direct current. A large rectifier of this type is now being used for this purpose by a Chicago district steel mill.



China Must Go Abroad For Iron

By THOMAS T. REED

Columbia University School of Mines



THE hardy perennial of blast furnace plants in China is that now known as the blast furnace division of the Liu Ho Kou Coal Mining Co., though originally built by the Yangtze Engineering Works at Seven Mile Creek, which is at the distance indicated by the name, below Hankow. The impulse for its construction came from the fact that during the World War the price of pig iron rose to \$200 Chinese per ton. The 100-ton blast furnace, constructed in part at least of second-hand material, was completed just at the end of the War, in time to encounter the post-war difficulties. These proved too much for the original promoters, and in 1924-25 the plant passed into the hands of the coal mining company, which has since operated it, subject to interruptions from such causes as floods, civil uprisings, and inability at times to sell its product. As I understand it, while it has never made any money, it has also not lost enough to kill all hope that eventual success may be attained. As an important outlet for part of the output of the coal mine it probably has advantages that are hard to estimate.

As indicated, the coke is obtained from Liu Ho Kou, where it is made in native ovens that are a sort of cross between a charcoal meiler and a beehive oven. Though very low in sulphur it is high ash, 18 per cent, and also carries phosphorus, as many Chinese coals do, and so makes it difficult to make a low-phosphorus pig iron. It also varies a good deal in size and structure as delivered. Limestone is obtained from a quarry about 10 miles from

THE present state of war between China and Japan brings up the question of Chinese blast furnace capacity. This is dealt with in the accompanying article by a recognized authority who recently returned from an inspection trip through the Orient.

the plant, and the ore comes from the Hsiang-pi-shan pit at Tayeh. The capacity of the plant varies with the weather, in winter it sometimes reaches 110 tons per day but during the very hot and humid summer season it drops off about 20 per cent. I was told that it used to operate at 5 lb. blast pressure, but that recently they had cut it to 3 lb. with improved results. They have a very open-textured stock column.

Chinese Skilled As Pattern Makers

Like any other merchant furnace, operations vary according to what they are able to sell, but mostly they make foundry iron. Recently they have gone into the making of finished products, such as cast-iron water-pipe and steam radiators. They seemed to be doing an excellent job on the radiators (Chinese are extremely skilful in making patterns and moulds) and they have a small malleablizing plant for making radiator fittings. The great difficulty in operating a plant in China is that orders are so small, much smaller than would be accepted in America, but the outlook for financial success is now

better than ever before. At any rate the plant is still operating, while all the others, with one exception, are closed down.

The exception is the little 20-ton furnace of the Pao Chin company, built in 1917. This is at Yangchuan, on the meter-gage railway that connects Tai-yuan-fu with the Peking-Hankow line at Shih-chia-chuang, and just half-way between the two places. Although I visited it I was not able to get any information about its operations as the manager, the only one at the plant who spoke English, was away at the time. But I carried away the impression that it was not making any money, though it has ruined the native smelting industry (which has been described by Shockley and myself) for miles around. This in turn has caused a depression in the agriculture of the region, which is not very prosperous anyway.

This exhausts the list of operating plants, at the present moment. Those in Manchukuo are omitted as being no longer politically in China. Among those that are "gone but not forgotten" are the two 75-ton and two 250-ton furnaces of the Han-Yeh-Ping company at Hanyang and the two 450-ton furnaces the provincial government built at Tayeh. Less well known is the 25-ton furnace that was built by local capital in 1924 at Hsin-hsiang, in Honan, a short distance north of the Yellow River. This operated from June 1 to Sept. 12 of that year, and was then blown out, having made the record of averaging 5071 lb. of coke per ton of pig

(CONTINUED ON PAGE 87)

Power

Transmission

By FRANCIS JURASCHEK
Consulting Editor, The Iron Age

Couplings

CHAPTER 19 of a comprehensive series on the Economics of Industrial Power Transmission.



WHENEVER power may be applied from a driving shaft to a driven shaft at the same speed, and along the same line, the means of making the physical connection between the two shafts is a coupling. Couplings may be divided into two principal classes, rigid and flexible. Rigid couplings are only used for connecting the abutting ends of power transmission lineshafting together, since in lineshafting installations the lengths of shafts between the bearing supports on either side of the joint provide a certain degree of longitudinal elasticity to compensate for the slight line and radial misalignments caused by operating stresses even with shafting that is perfectly aligned when in a state of rest. When running, all lineshafting is subject to stresses which tend to throw the end-align-

ment out. These stresses are due in most part to the fact that loads pull the shafting in certain directions, while the reactions at the bearing supports are exerted in opposite directions, and these actions and reactions come at different points along the shafts.

With the short shafts, closely supported, used in the direct-coupling of motor to machine, there is no opportunity for the shafts themselves to absorb the stresses causing operating misalignment, and that reason, and also because of the extreme difficulty of obtaining absolutely true alignment of the two shafts even in a state of rest, couplings of the flexible type should always be used.

Rigid Couplings

Rigid couplings may be of the flanged or sleeve types, keyed to each shaft, or of the compression type, key-less. Flanged couplings are adapted for all sizes of shafts. They may be had with plain faces, with plain faces and a separator plate between, or with male and female faces interlocking. In any case, the two flanges, each being

keyed to its respective shaft, are fastened rigidly together with several through bolts.

Sleeve couplings consist of either a plain, slit cylindrical sleeve extending for several inches to either side of the actual joint and secured to each shaft by setscrews (this type is used only for small, low-powered shafting), or a sleeve and a ribbed cover in which short, transverse bolts set on opposite sides of the shafts may be set up tightly to compress the sleeves over both shafts in a positive grip. The ribbed cover and the sleeve may be fashioned all in one, in two halves which fit together, or the sleeve and the ribbed cover may be separate pieces. In any case, both shafts are keyed to the sleeve, so that compression alone is not depended upon to form the means of making one shaft turn the other. Ribbed sleeve couplings are seldom used to connect shafts larger than 6 in. in diameter; and plain sleeve couplings are not advisable for connecting shafts over 1 15/16 in. in diameter.

The compression, or keyless coupling employs a slotted, tapered

sleeve extending over the joint, or two cone-shaped sleeves situated on the ends of each abutting shaft, with two through-bolted flange

coupling to maintain permanent alignment. Its use on non-permanent construction is common.

Both flanged and ribbed sleeve

tically no projecting surfaces on which dust may collect. It finds wide use therefore in textile mills where flying lint is a problem. It is not, however, commonly used for general industrial shafting work.

Special Devices

The universal coupling is a device designed to permit the driving shaft to be set at an angle with the driven shaft. With a single universal coupling the angle of the two shafts may be as large as 15 degrees; with a double universal coupling the angle may be 30 degrees. Such couplings are not used with shafts over 4 in. in diameter, and in industrial practice, for shaft speeds exceeding 250 r.p.m. The greater the angle between the two shafts, the less should be the speed of rotation.

A collar is an annular band fastened to the shaft by set screws or bolts, next to the bearings, to prevent end-float of the shaft caused by the side-thrust of the imposed loads. It acts as a stop to prevent the shaft working sidewise out of the bearings. Collars should be used on each end of lineshafts next the end-bearings, and, where side-thrust is pronounced, at intermediate bearings.

Flexible Couplings

In the sense that electricity in the distribution line is not power in itself, but, like steam, fuel oil or the river torrent, is merely a



Fig. 1—Dodge flange coupling on a rope-driven jackshaft in a large paper mill.

plates around the sleeve member. When the through bolts are thoroughly tightened, these surrounding flanges are drawn up on the cone surface of the sleeve or sleeves, compressing them to a very tight fit on the shaft ends, so that no keys are required. It is not recommended for heavy duty nor for shock loads.

Rigid Applications

There are several factors to be considered in the application of rigid type couplings:

The flanged coupling is advisable where the installation is of a permanent nature, where permanent alignment is difficult to maintain, and where the shafting is of large sizes. The plain-flanged type permits easy removal of a shaft section; the separator plate type permits disconnection of one shaft from another without removing the coupling itself. The male and female type insures greater permanency of alignment, but for removal the shaft must be backed off sufficiently to disengage the two flange faces.

The sleeve type coupling facilitates quick shafting erection, as it is easier to handle and apply than the flanged type. It is not advisable to use it in any form with shafting over 2 15/16 in. diameter, and it is not adapted as well as the flanged

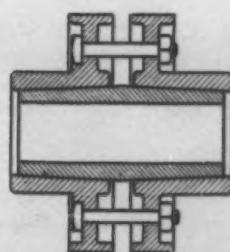


Fig. 2—Diagram of typical keyless compression coupling. Courtesy Link-Belt Co.

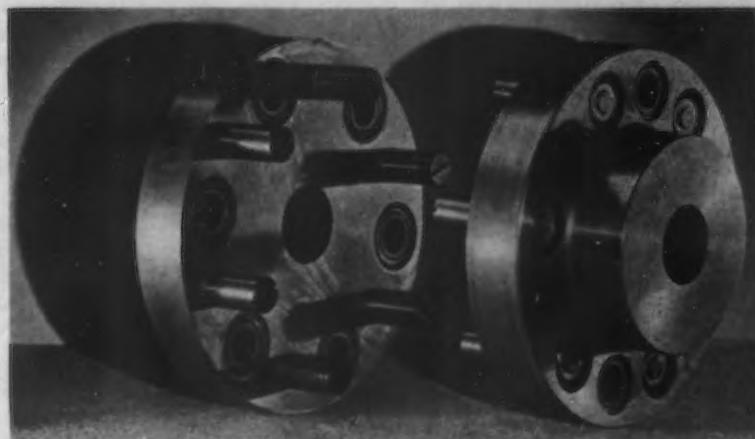


Fig. 3—Ajax pin-and-bushing type coupling, with the two flanges separated.

couplings may be used to couple shafts of different diameters.

The compression type of coupling is particularly adapted for dusty atmospheres as it provides prac-

tical source of power, a motor may be regarded as a prime mover. In mechanical power transmission problems a motor is always put on a par with the steam engine, the

internal combustion engine and the water-wheel because classification with such prime movers simplifies the problem.

Actually, of course, the limitations imposed by regarding a motor as the source of power rule out of practical consideration just about one-half the potential sources of waste in power transmission, for the electrical phase shares equally with the mechanical phase the responsibilities and duties involved in applying power to the machine. Both great economic drive systems must be examined in both phases. Individual motor drive and modern group drive alike begin at the electric meter and end at the driven machine.

Only when the electrical phases of transmission have been duly con-

when both shafts turn at the same speed, and both shafts are in the same straight line. But, at no time except in a state of rest can there be perfect and permanent alignment of driving and driven shafts. Aside from the torsional and vibrational disturbances in all rotating machinery, the uneven settling of machinery foundations or supports, the deflection of shafts produced by overloads or unbalanced loads, inequalities of tension in the drives, and changes of temperature affecting unequally the coefficients of expansion of various materials used in the drive, may one or all tend to throw the two abutting shafts out of line. Where distances either side of the joint to the supporting bearings are short (as in direct-coupled motor and

what like cutting one's foot off the right leg to make it equal in length to a six-inch shorter left leg. Align both shafts as perfectly as possible when both are idle—then use a flexible coupling to take up the variations due to operating conditions beyond your control. Do not expect the coupling to give greater service than this.

The design of flexible or self-aligning couplings must be such as to permit power to be transmitted under any of the conditions of misalignment enumerated above without causing undue stresses in either shafts or bearings, and to permit both shafts to rotate as free from lateral dependence upon the other as possible. This is accomplished in certain types of couplings by means of flexible materials interposed between the two shaft-end members, as rubber, leather, fiber and thin steel; in other types it is accomplished by a design of rigid members not fastened to each other, but permitted to slide on one another. Not all so-called flexible couplings possess the characteristic of torsional resiliency. For steady loads this is not needed; but where shock loads, or loads of pulsating character are encountered, it becomes extremely important, as vibration, regular or intermittent, injures couplings which are not torsionally resilient.

Types of Flexible Couplings

Sliding Member. Many varieties of couplings are available in which a freely floating third member, located between two face plates, each keyed to its respective shaft, enables the coupling to correct shaft misalignment through the sliding of the third member on the other two. In one form a raised lug extending across the diameter of the third member fits into a corresponding groove in the face plate of one shaft end; a corresponding lug in a line 90 degrees from the first, on the other side of the third member fits a similar groove in the face plate of the other shaft end. Both these lugs are free to slide small distances in their corresponding face plate grooves. In another type radial lugs on the third member fit loosely into corresponding radial grooves in the two face plates. A third type, even more common since it is older, consists of a square third member smaller than the adjoining circular face plates, with two enveloping lugs on

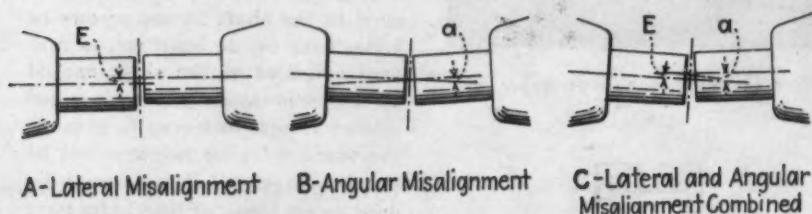


Fig. 4—Diagram showing types of misalignment between two abutting shafts. Courtesy Gustave Fost.

sidered and disposed of may the mechanical phase be fairly considered. At that point, the motor *may* be called a prime mover. From there on the factors to be discussed center around the best way of connecting the motor to the machine.

The motor shaft turns and its output is usable power. The machine spindle is to be turned and power must be used to do so. The question is, how may the connection best be made with the least loss of power, the greatest flexibility in the use of that power, and the least damage to driving and driven mechanisms? Of the seven available methods (see chart "From the Meter to the Machine" published Aug. 26, 1937) we shall here consider only the first—direct-coupling. And, since the question is not one of coupling lineshafts, but of coupling a prime mover directly to a machine, the means of making the connection must be some form of flexible coupling.

As a first consideration it may be well to repeat the opening sentence of this article, paraphrased to suit this condition. A motor may be directly coupled to a machine only

machine) some form of flexible coupling is invariably indicated, to avoid bending stresses in the shafts, excessive pressures on the bearings, and damage to both driving and driven mechanisms.

In Fig. 4 the three conditions of misalignment are clearly indicated. The center lines of the two shafts may be exactly parallel, but not on the same center. This is known as lateral misalignment. The center lines of both shafts may meet at a common point in the middle of the space between the two shaft ends, but these lines may deviate from a straight line common to both. This is known as angular or axial misalignment. Finally both lateral and angular misalignment may occur in combination.

The term "flexible" as applied to a coupling is somewhat unfortunate. Long use has sanctioned it, rather than the more expressive term "self-aligning." No flexible or self-aligning coupling should be regarded as a universal joint. To a limited degree, it performs the functions of one, of course, but to use a flexible coupling as a cure for badly misaligned shafts is some-

one face plate fitting loosely over two sides of the square third member, and two similar lugs on the other face plate fitting over the intermediate sides of the square third member. In operation, all these

plates. The spring packs give a certain degree of torsional resiliency, which is limited by solid pins, shorter than the spring packs, which engage in stops when the load bends the spring packs unduly.



AT LEFT

Fig. 5—Waldron coupling of the gear-engagement type, for heavy duty service.

• • •

BELOW

Fig. 6—Diamond double chain coupling connecting 25 hp. gearmotor and a gear pinion.

types work somewhat like a jaw clutch. The ends of the two shafts must be held from end-float by collars, else the parts of the coupling will pull apart, as there is no actual fixed connection between them.

Pin-and-Bushing. In these couplings, hardened steel pins set in a circle on the face of each end plate fit into holes lined with bushings of elastic material inserted in the opposite plate. All pins may be in one plate and all bushings in the other, or, more commonly, pins and bushings may alternate around the circle in each plate. A variation of this provides for hemispherical indentations in each face plate, with rubber balls between, fitting part-way into corresponding indentations in each plate. The transmission of higher powers may be accomplished with less wear and tear on the pin-and-bushing type if the pins are made of finely laminated spring steel, and the bushings of bronze or graphited metal.

Laminated Spring Pack. This is a development from the laminated pin and the radial lug floating third member types. Instead of a solid third member, a number of packs of finely laminated spring steel are set radially in corresponding radial grooves of both face



All the above types of flexible couplings have no fixed connection between the two face plates, therefore stops must be provided to limit the end-float of the shafts.

Cylindrical Spring-grid. In this we have the first type of flexible coupling so far considered which has a positive connection between the two shaft-end members. It is one of the best-known of all flexible

couplings, having been made famous by the work of the great authority on couplings, Gustave Fast. The peripheries of two flanged steel hubs, each keyed to its respective shaft, are grooved, and in the matching grooves of both hubs a chrome-vanadium steel spring is threaded back and forth until it forms a complete connecting grid. A metal cover encases both hubs and the connecting spring grid, and the entire coupling within this shell is packed with grease. This type of coupling possesses large capacities for angular and lateral misalignment correction, and likewise provides for free end-float of both shafts at all loads. Power capacities range up to about 18,000 hp. at 100 r.p.m.

Gear Engagement. In this form of coupling, hubs keyed to each shaft are carried back a few inches from the shaft ends, and terminate there in a form of spur-toothed gear called a "spline." Extending over the joint and beyond these

splines is a sleeve in which an internal gear is cut at either end to mesh with the external spline on each shaft hub. The slight clearance between each pair of external and internal splines permits the positive transmission of power even with a definite error of misalignment between the shafts. The entire coupling is filled with oil to a definite level, so that the load-

carrying surfaces are lubricated constantly. Although this design must be classed as non-resilient, it is capable of absorbing severe shocks and vibration since the sliding metallic parts are protected by an oil film. When made of forged steel throughout it is claimed that this type of coupling is capable of transmitting up to 61,800 hp.

Chain Couplings. Of recent years a large number of chain type flexible couplings have been developed which combine most of the advantages of other types. Two small sprocket wheels are keyed to the abutting ends of the driving and driven shafts; around these

one shaft turns, the pins drag the belt in a never-ending series of loops, causing the pins in the other ends of the loops to turn the driven shaft. The free end-float of the shafts must, of course, be restricted.

Flexible Coupling Characteristics

For the mechanical types of flexible couplings heretofore considered several fundamental service characteristics should be noted:

1. All designs are not equally adapted for the correction of angular or radial misalignment, or both, and some designs will accommodate greater degrees of error in each

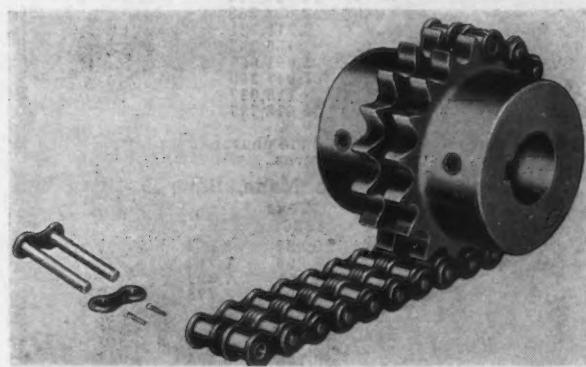
examined, the selection of a coupling will be found to be narrowed to a small number of types, and the choice may be further influenced by considerations of cost, accessibility and maintenance.

2. Cost, of purchase, of installation and of maintenance, should be considered only after the conditions of service have been adequately met. As between two or more types which meet equally all service conditions, however, this factor may well be a determining one.

3. Maintenance is, of course, dependent to a large degree upon the selection of the proper design to meet the conditions of service. Further, however, it will be dependent upon the actual design and construction of the coupling, the ease of accessibility for inspection, lubrication where required, and repairs. Certain designs permit of shaft connection and disconnection without removing the coupling. This may be an important factor where the connected units are heavy and cumbersome. In any event, a coupling which may be easily installed or removed has some advantage over one which requires considerable time and skilled effort to apply.

Hydraulic Couplings

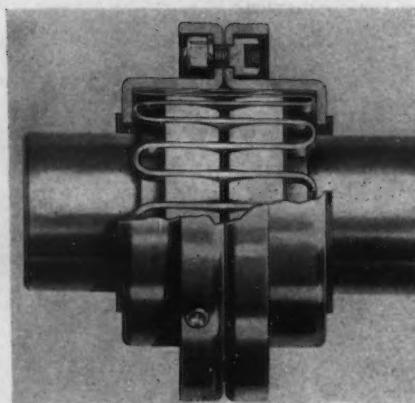
Great progress has been made in recent years in the design of hydraulic couplings in which power is transmitted by the kinetic energy of a fluid (usually oil) discharged by an impeller directly against the vanes of a runner, with no mechanical connection between the driving and the driven parts of the mechanism. Since this form of coupling is part of the relatively new subject of hydraulic transmissions, and requires an extended treatment of the characteristics of hydraulic drives to be described adequately, further discussion of hydraulic couplings will be postponed to a later article to be devoted entirely to hydraulic transmission design. Here it may be noted, however, that such couplings are particularly adapted for the driving of variable speed fans, blowers, pumps, etc., especially in connection with power plant operations, and that their use is being adapted with considerable success for certain heavy-duty machine tool operations where an extremely smooth flow of power with stepless variation of speeds is required.



AT LEFT
Fig. 7—Disassembled view of the Diamond double chain flexible coupling.

• • •

BETWEEN
Fig. 8—Falk flexible coupling of the spring-grid type, with cover removed.



sprocket wheels is wrapped an endless, fairly snug-fitting chain; and the whole enclosed, or not, as conditions dictate, with a metal casing. A positive transmission of high efficiency results, capable of correcting fair degrees of angular and lateral misalignment at all loads. Torsional resiliency is, of course, limited to the play provided by the clearances between all the individual pins and links of the coupling chain. Such couplings are made in sizes capable of transmitting 30,000 hp. at 700 r.p.m.

Pin-and-Belt. A form of flexible coupling now rarely seen, but which has merit for certain light-load applications, uses an endless narrow belt running around loops formed in the belt by two concentric sets of projecting pins. On one face plate the pins are set around a large circle; on the other they are set around a smaller circle. The plates are held far enough apart so that the pins of one do not touch the other plate. The belt is woven alternately from a pin of the larger circle to a pin of the smaller circle, all around both circles. The belt is semi-elastic. As

case than others. The exact conditions of service should be determined, therefore, with respect not only to the character and degree of misalignment which may be encountered, but also with respect to the speed of operation and the amount of power transmitted, and the character of the load. For steady loads, the non-shock absorbing types may be adequate. For loads which are pulsating, or in which intermittent shock is encountered, a torsionally resilient type will be indicated. When the conditions of service have been rigidly

August Pig Iron Output Up 3 Per Cent in Daily Rate

PRODUCTION of coke pig iron in August, at 3,605,818 gross tons, compares with 3,498,858 tons in July. The daily rate last month continued to rise, the gain over July amounting to 3 per cent, or from 112,866 tons to 116,317 tons.

There was a net loss of one furnace making iron on Sept. 1, the 191 furnaces operating at the rate of 115,420 tons daily, against 192 on Aug. 1, producing 115,445 tons daily. Four furnaces were blown out or banked and three were put in blast. The United States Steel Corp. took one off blast, and independent producers blew in three furnaces and took the same number off blast.

Among the furnaces blown in were the following: One Susquehanna, National Steel Corp.; one Cambria, Bethlehem Steel Co., and the new Hamilton No. 2 furnace of the American Rolling Mill Co.

Furnaces blown out or banked included one Isabella unit of the Carnegie-Illinois Steel Corp., one Sparrows Point furnace, Bethlehem Steel Co., one Haselton, Republic Steel Corp., and one Colorado Fuel & Iron Co. furnace.

The number of available furnaces making pig iron has been increased from 238 to 239 by the addition of the new Hamilton No. 2 furnace of the American Rolling Mill Co.

Production by Districts and Coke Furnaces in Blast

Furnaces	(Gross Tons) Production		Sept. 1		Aug. 1	
	August (31 Days)	July (31 Days)	Number in Blast	Operating Rate, Tons a Day	Number in Blast	Operating Rate, Tons a Day
New York:						
Buffalo	233,946	233,374	12	7,860	11	7,600
Other New York and Mass.	40,459	40,583	3	1,305	3	1,310
Pennsylvania:						
Lehigh Valley	89,928	83,133	6	2,900	6	2,710
Schuylkill Valley	40,933	43,576	3	1,320	3	1,405
Susquehanna and Lebanon Valleys	36,199	40,446	2	1,170	2	1,305
Ferromanganese	...	...	0	...	0	...
Pittsburgh District	769,455	794,715	38	24,820	38	26,140
Ferro. and Spiegel	23,646	19,331	2	670	3	625
Shenango Valley	70,382	70,470	4	2,235	4	2,275
Western Pennsylvania	102,719	88,909	7	3,630	6	2,870
Ferro. and Spiegel	11,548	9,183	2	375	2	295
Maryland	148,375	142,828	5	4,055	6	4,605
Wheeling District	173,590	165,593	8	5,600	8	5,510
Ohio:						
Mahoning Valley	354,657	354,266	17	11,105	18	11,430
Central and Northern	317,358	254,238	16	10,235	16	9,185
Southern	55,077	47,552	5	1,875	4	1,595
Illinois and Indiana	718,815	681,426	31	23,355	31	23,095
Michigan and Minnesota	161,586	103,125	6	3,275	6	3,325
Colorado, Missouri and Utah Ferromanganese	45,929	50,499	2	1,010	3	1,385
Total	3,605,818	3,498,858	191	115,420	192	115,445

Daily Average Production of Coke Pig Iron

	Gross Tons				
	1937	1936	1935	1934	1933
January	103,597	65,351	47,656	39,201	18,348
February	107,115	62,886	57,448	45,131	19,798
March	111,586	65,816	57,098	52,243	17,484
April	113,055	80,125	55,449	57,561	20,787
May	114,104	85,432	55,713	65,900	28,621
June	103,584	86,208	51,570	64,328	42,166
1/2 year	108,876	74,331	54,138	54,134	24,536
July	112,866	82,686	49,041	39,510	57,821
August	116,317	87,475	56,816	34,012	59,142
September	...	91,010	59,216	29,335	50,742
October	...	96,512	63,820	30,679	43,754
November	...	98,246	68,864	31,398	36,174
December	...	100,485	67,950	32,149	38,131
Year	...	83,658	67,556	43,592	26,199

Production of Coke Pig Iron and Ferromanganese

	Gross Tons		Ferromanganese	
	Pig Iron*	Pig Iron*	1937	1936
January	3,211,500	2,025,385	22,060	24,766
February	2,999,218	1,822,706	24,228	24,988
March	2,489,473	2,040,311	27,757	22,725
April	3,391,665	2,403,683	26,765	19,667
May	3,637,231	2,648,401	34,632	18,363
June	3,107,506	2,586,240	34,415	17,549
1/2 year	19,706,593	13,528,226	170,857	128,058
July	3,498,858	2,594,268	23,913	20,205
August	3,605,818	2,711,721	29,596	20,658
September	...	2,730,293	...	15,919
October	...	2,991,887	...	19,305
November	...	2,947,365	...	24,368
December	...	3,115,037	...	25,715
Year	...	30,618,797	...	254,728

*These totals do not include charcoal pig iron.

†Included in pig iron figures.

Merchant Iron Made, Daily Rate

	Tons				
	1937	1936	1935	1934	1933
January	16,106	10,537	3,926	7,800	2,002
February	16,514	11,296	6,288	7,971	2,863
March	16,457	10,831	7,089	7,197	2,412
April	14,517	13,897	8,799	8,838	1,908
May	19,482	12,814	8,441	9,099	3,129
June	15,870	14,209	7,374	9,499	4,088
July	19,609	11,619	8,644	7,380	6,783
August	17,381	12,148	8,194	6,043	7,756
September	...	12,526	10,090	4,986	10,034
October	...	13,645	11,199	5,765	8,634
November	...	14,739	12,503	6,610	7,629
December	...	14,852	13,312	4,399	8,358

Carbon Monoxide Gas In Foundries Studied

CARBON monoxide gas in foundries has been definitely traced to the use of pitch, sea coal and organic core binding materials, according to a report issued by Elmer F. Andrews, commissioner, New York State Department of Labor. An investigation of carbon monoxide as a health hazard in foundries, conducted by the labor department, showed that pitch gave off the greatest amount of CO gas, sea coal somewhat less and core binding materials a relatively small amount. It was found that practically all of the gas is given off during the gassing of the mold.

Among the remedial suggestions made by the investigators were that weight shifters on conveyor pouring stations should be especially protected due to their close proximity to the gases, and that cores, which give off irritating fumes when hot, should not be removed from the ovens until thoroughly cooled, or if this is impractical other core binders of less irritating nature should be used.

THIS WEEK ON THE ASSEMBLY LINE



... Vacuum control of transmission gear shifting to be feature of 1938 models.

• • •
... Briggs begins manufacture of window moldings and prepares for further expansion on Mound Road site where Dodge is building.

• • •
... Martin retains control of UAW committee, but rancor prevails as convention ends.

• • •
... Ford plans new rural factory to manufacture carburetors at Milford, Mich.

DETROIT, Sept. 7.—Power transmission from the automobile engine to the wheels has caused a lot of thinking in automobile engineering laboratories in recent years. In the last year the various proving ground units and test drivers have had more than their share of overdrives and automatic transmissions for experimenting. There are perhaps more than a quarter million cars on the road now with various automatic shifting devices and probably about the same number of overdrives. This year manufacturers will try to sell the public more of this kind of equipment. Among the manufacturers who have not ventured into the automatic shifting field, three or four will offer vacuum control of shifting devices. These will remove the gear shift lever from the floor of the front compartment and de-

crease the effort required to shift gears. In one case, the engineers then removed the hump in the front floor board by the simple expedient of turning the transmission on its side and letting it operate that way.

Plymouth is said to have worked up a new transmission, but with a more conventional manually operated shift. Chevrolet in the past year had a new transmission and new hypoid rear axle, plus a new engine, and this year completes the job by putting in a newly designed clutch. Apparently such parts as these or perhaps the knee action mechanism are due for a pretty thorough revamping. At the Chevrolet plant, where such parts are manufactured, changes in the set-up are reported to be the most complete in several years. Another plant that has undergone a lot of changes is DeSoto. A new

plant opened last fall added almost 100 per cent to DeSoto production for the year, but more than 100,000 sq. ft. of floor space is being added with the construction of a third story. According to Byron C. Foy, president of the DeSoto Division, this will permit DeSoto to expand into even more extensive volume production. Most of the space will be utilized for additional paint spray equipment and for storage of bodies and parts. In the present building some new presses are being erected. A new frame receiving building adjacent to the start of the chassis assembly line is being erected also. The construction will add 6000 sq. ft. of floor space and permit a 250-ft. extension of the chassis and final assembly lines. The erection of a new head house to prepare cars for shipment and the construction of a new loading dock will improve DeSoto's shipping facilities. A new personnel building near the McGraw gate to the plant is nearly ready for occupancy. These plant expansions are part of a \$100,000,-000 wave of construction projects that was set in motion in Michigan during the first half of 1937.

Briggs Buys Plant Site

Since the collapse of the Briggs-Motor Products merger plans, the Briggs Mfg. Co. has done a lot of paper work looking toward expansion. It has recently purchased an 80 or 90 acre plot on Mound Road near the plant now being built for Dodge Truck. Only a short time ago Briggs announced the purchase of 13 acres from the Hudson Motor Car Co. Originally it was reported that an important factor in Briggs' interest in Motor Products was the 60 or 65



acres which that firm had available adjacent to one of the Briggs property lines. Briggs is already withdrawing some of its work from Motor Products on window trimmings, moldings and instrument panels. A temporary set-up has been made in the Highland Park plant and the stampings for these parts are being received from Motor Products and the Detroit Moulding Co. to be cleaned, enamelled and baked. These parts are being made for Plymouth. Meanwhile, on the fifth floor 50 bays, 20 x 60 ft., are being cleared out for the installation of equipment to manufacture these parts.

It is generally reported that the new large plot of ground will be the site of a new body manufacturing plant. The site where Briggs and Chrysler are locating is all set to become a boom area for industrial and residential development. It is a few miles East of Woodward, between Eight and Nine-Mile Roads, just across the county line from Wayne County. It is already served by the Michigan Central Railway and that line has extended its switching limits from Eight Mile Road to Nine Mile Road. It is making extensive plans for laying track and starting a yard in this vicinity.

Doubled capacity is planned by Brass Forgings, Inc., a supplier of Chrysler, Briggs, Kelvinator and similar firms in Detroit. This manufacturer of brass and copper forging products will move in less than a month to a 50 x 150 ft. building in a new industrial area in Ferndale, between the Chrysler and Briggs sites and Woodward Avenue. With only hammer equipment now, this firm intends to put

in a forging press to expand its line. The cost of its new building will be \$22,000.

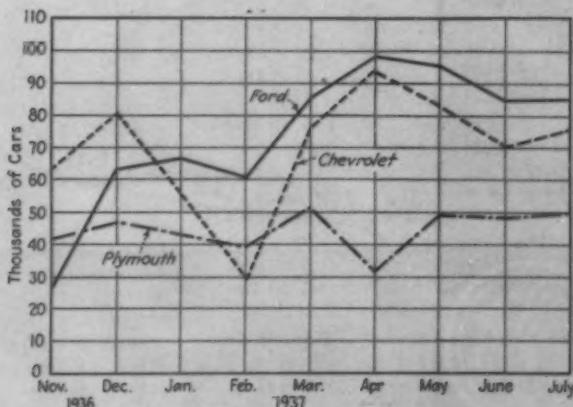
Suppliers who serve the automobile industry with virtually all parts that go to make the final car are busy now making up samples and parts to go on show cars.

UAW Fight a Draw

The outcome of the United Auto Workers' convention at Milwaukee apparently was a draw. Homer Martin was reelected president on a compromise slate that largely represents the aim and purpose of his Unity opponents when they went to the convention. Martin did not get the clean-cut victory he hoped for, although his progressive faction won a 15 to 9 majority on the newly enlarged executive committee. This means that for another year Martin will continue to control committee sessions and will have the cooperation of the Unity

faction only insofar as it will help the members of that faction to build themselves up individually or as a group. As stated last week, there is tension between Martin and John L. Lewis as a result of some of the incidents in connection with the convention. There is some question yet as to the reaction of auto workers when they will be called upon to pay an extra assessment to permit the CIO to wage its battle with the Ford Motor Co. this fall. In the United Mine Workers, which Lewis dominates, there would be no such question, because check-off would take the money from the pay checks in due course. Martin was reported back in Detroit immediately after the convention, but apparently left early in the week for a long weekend. His office did not expect him back until after Labor Day, at which time he probably will call General Motors officials for renewal of the negotiations on the

• • •
REGISTRATIONS
of the big three
1937 production
models (U. S. pas-
senger cars only)
• • •



The 18 Spindle Speeds of the P&W Model "C" Lathe are in ¹⁰⁰⁰ GEOMETRICAL PROGRESSION

Here, in graphical form, is the reason why you always have available the *right* spindle speed for a job on the P&W Model "C" Lathe. These eighteen speeds are arranged in geometrical progression, with no large gaps. This means that the next lower or higher speed is not a big jump away, but near enough so you can turn every job at full cutting efficiency.

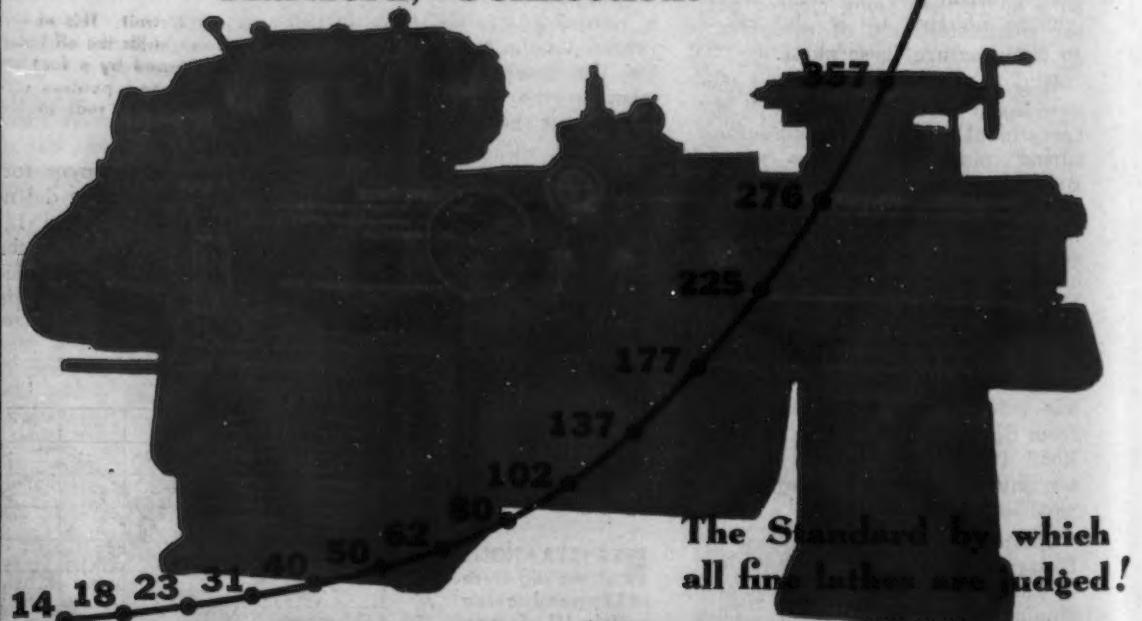
It is easy to figure out theoretical speeds in geometrical progression, the acknowledged ideal arrangement, but it is quite different to find reasonable gearing to actually produce these speeds. In the Model "C" Lathe the greatest variation from the theoretical speed is only 1½%, a real engineering accomplishment! The curve on this page shows the actual spindle speeds available.

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GM contract. It is admitted that prior to the UAW convention the union and General Motors officials had reached a tentative agreement on the issue raised by William S. Knudsen when he demanded assurance that there would be no unauthorized strikes. Probably the first of next week the two groups will actually meet around the table again.

Some delegates returning from Milwaukee declared that the election was steam-rollered by CIO leaders. Impartial observers agree that the election sessions had all the earmarks of being run by the CIO. After final caucuses of the Unity faction and the Progressives, including a threat by Richard Frankensteen to settle some matters in the alley with Ora L. Gasaway, a Lewis lieutenant, the elections were held. Gasaway, not an auto worker, was in the chair. The best picture of what happened leads off with a quotation from Gasaway:

"Well, we are going to see now if we are big enough to shorten the hours (of the session). We are going to find out now whether men will do what they say they will do or not***. Let us see whether we have that unity from those who attended the two different caucuses. I will therefore call upon Richard Frankensteen to state to this convention whether or not their caucus has agreed to go along with the proposal or myself, representing Mr. Lewis, and the proposal put to you this morning by Brother David Dubinsky."

This is one of several admissions at open sessions that Lewis and other CIO leaders were steering the convention the way they wanted it to go. Indicative of the rancor that prevailed to the last was Frankensteen's statement after he said that his group was ready to vote as directed. "I want to assure the delegates who have been in the other caucus," he said, "that I am not a horse thief *** we do not feel that Brother Mortimer or Brother Hall are horse thieves."

Nominations were made by delegates seated on the platform after they had been called upon individually to make the nominations by CIO leader Gasaway.

Another Little Ford Plant

Henry Ford has taken another step in his decentralization program of building little factories in rural Michigan. A carburetor manufacturing plant, to be erected at Milford, will be 200 x 60 ft. in size and will be a modern structure surrounded by spacious lawns and trees, as are the other rural plants operated by Ford. Power

will be supplied from two small hydro-electric generator stations producing 450 hp., one supplied with water by a flume from a lake and the other supplied from the Huron River. This makes the twelfth Ford "little factory in a meadow." Valves are now produced at Northville, gages at Waterford, generator cutouts at Phoenix, taps at Plymouth, twist drills at Newburg, dial faces and engravings at Nankin Mills, lamps at Flat Rock, starters and generators at Ypsilanti, welding electrodes at Dundee and soy bean products at Tecumseh and Saline. Ford carburetors at present are Strombergs, manufactured by a Bendix unit.

Production Better Than Year Ago

Automobile production in the last week was more than twice as great as the corresponding week a year ago. According to Ward's Automotive Reports, output was 64,200 units compared with 31,601 units a year ago. The 64,200 figure was more than 20 per cent lower than 83,310 for the previous week. With production holding up to this high level, it is probable that a record for the last quarter of any model year will be established. Ford Motor Co. is reported to have produced 26,000 units and General Motors divisions 26,600. The one big drop was at Chrysler, where the group production dropped from

23,950 a week ago to 5800, as preparations increased for changes over to new models. Indications are, according to Ward's, that output in September will be approximately 190,000 units, almost 36 per cent better than last September's total. If these predictions hold good, the quarterly total will be approximately 1,025,000 cars and trucks.

Toledo reports 17 per cent increase in business volume above a year ago, with industrial employment continuing near the average for the year, despite the fact that August was the month in which motor parts makers took inventory. Willys-Overland Motors, Inc., has completed its scheduled production and is now preparing for larger output for the coming year. Part of the old Willys-Overland plant is being used for building house trailers by a new firm, the Hargo Mfg. Co.

Whiting Corp., Harvey, Ill., recently gave an all-day picnic for its employees and their families. A feature was the award of service emblems to 279 employees. Three classes of emblems were given out: solid gold with a diamond to 42 25-year employees, a gold emblem to 176 10-year employees, and a sterling silver emblem to 61 5-year employees.

YOU'VE guessed it. He is drilling for oil—in Detroit. This new automatic drilling machine, designed and built by Plymouth men, drills the oil holes in four connecting rods at a time. Four cam feed drills are tripped by a foot pedal and operate simultaneously, returning automatically to the starting position after the holes are drilled. The operator loads the machine with pairs of rods at the loading station directly in front of him.



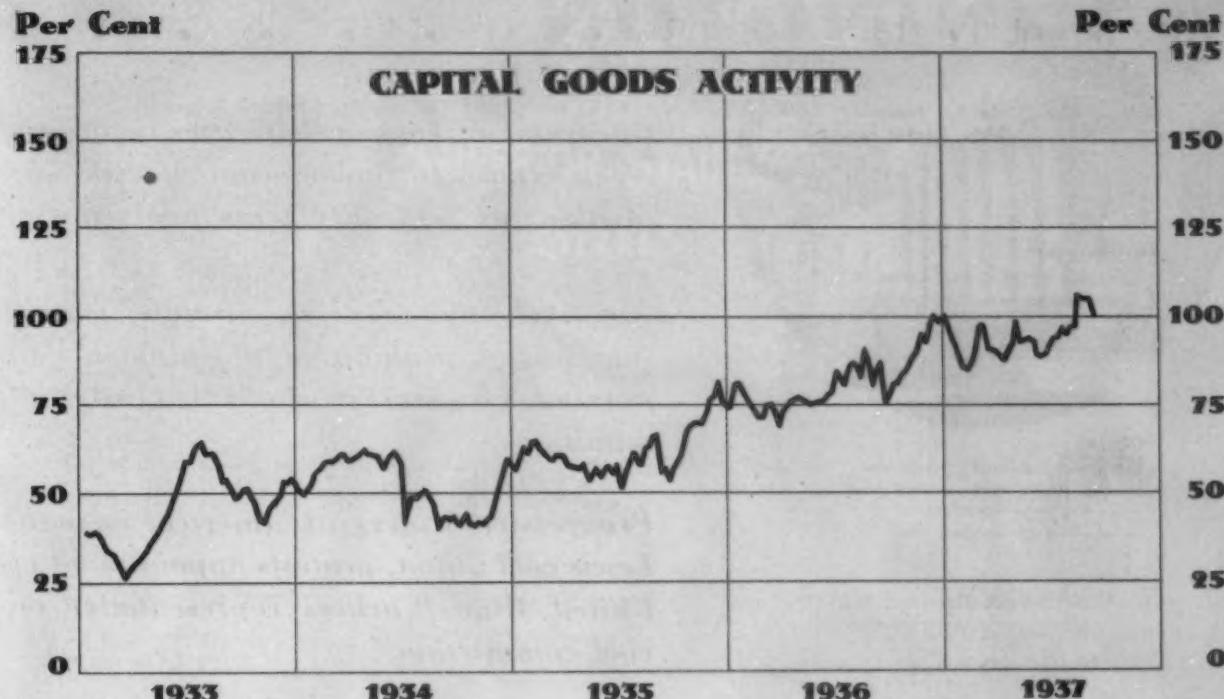
Current Metal Working Activity Statistically Shown

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	July 1937	June 1937	July 1936	Seven Months 1936	Seven Months 1937
Raw Materials:					
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Coke production (net tons) ^b	4,707,106	4,298,559	3,827,400*	25,113,000*	32,226,934
Pig Iron:					
Pig iron output—monthly (gross tons) ^c	3,498,858	3,107,506	2,594,268	16,122,494	23,205,451
Pig iron output—daily (gross tons) ^c	112,866	103,584	83,686	75,692	109,460
Castings:					
Malleable castings—production (net tons) ^d ...	45,479	54,026	44,413	318,505	397,334
Malleable castings—orders (net tons) ^d	41,353	43,141	41,031	306,086	376,211
Steel castings—production (net tons) ^d	86,978	101,239	78,654	420,236	683,539
Steel castings—orders (net tons) ^d	57,799	71,817	74,001	497,555	666,707
Steel Ingots:					
Steel ingot production—monthly (gross tons)*.....	4,556,596	4,183,762	3,914,370	25,190,467	33,321,229
Steel ingot production—weekly average (gross tons)*.....	1,030,904	975,236	885,604	827,817	1,100,074
Steel ingot production—per cent of capacity*.....	78.49	74.46	67.61	63.20	83.75
Finished Steel:					
Trackwork shipments (net tons)*.....	8,252	9,194	6,216	40,808	62,260
Fabricated shape orders (net tons) ^e	160,970	175,552*	199,057*	961,033*	1,079,769
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Ohio River steel shipments (net tons) ^f	163,705	147,100	110,495	576,116	821,395
Fabricated Products:					
Automobile production, U. S. and Canada ^k	456,775	521,139	451,206	3,045,714	3,374,195
Construction contracts, 37 Eastern States ⁱ	\$321,602,700	\$317,842,100	\$294,734,500	\$1,532,075,300	\$1,815,253,900
Steel barrel shipments (number) ^j	715,014	929,536	749,415*	4,652,131*	6,041,341
Steel furniture shipments (dollars) ^j	\$2,071,417	\$2,183,481	\$1,510,716	\$10,722,134	\$15,781,603
Steel boiler orders (sq. ft.) ^d	979,316	719,008	1,109,952*	5,760,557*	6,432,625
Locomotive orders (number) ^m	3	22	9	131	231
Freight car orders (number) ^m	1,030	528	4,469	31,023	46,120
Machine tool index ⁿ	171.1	191.8	150.1	+132.6	+190.5
Foundry equipment index ⁿ	204.0	228.2	159.6	+155.4	+224.7
Foreign Trade:					
Total iron and steel imports (gross tons) ^p	44,771	47,940	367,085	.....	.....
Imports of pig iron (gross tons) ^p	7,541	12,496	110,003
Imports of all rolled steel (gross tons) ^p	24,656	19,638	143,406
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British steel ingot production (gross tons) ^r	1,059,200	1,106,400	974,100	6,718,300	7,397,600
Non-Ferrous Metals:					
Lead production (net tons) ^s	45,496	40,156	39,576	263,591	299,630
Lead shipments (net tons) ^s	47,727	42,710	38,996	254,733	360,367
Zinc production (net tons) ^t	49,181	50,526	45,481	299,213	329,771
Zinc shipments (net tons) ^t	49,701	50,219	41,819	294,306	369,165
Deliveries of tin (gross tons) ^v	4,980	6,645	7,120	44,140	49,415
Copper production, refined (net tons) ^w	79,611	86,016	53,985	410,165	567,076

* Three months' average. * Revised.

Source of figures: ^a Lake Superior Iron Ore Association; ^b Bureau of Mines; ^c THE IRON AGE; ^d Bureau of the Census; ^e American Iron and Steel Institute; ^f American Institute of Steel Construction; ^g United States Steel Corp.; ^h United States Engineer, Pittsburgh; ⁱ When preliminary from Automobile Manufacturers Association—Final figures from Bureau of Census. ^j F. W. Dodge Corp.; ^m Railway Age; ⁿ National Machine Tool Builders Association; ^o Foundry Equipment Manufacturers Association; ^p Department of Commerce; ^q British Iron and Steel Federation; ^r American Bureau of Metal Statistics; ^s American Zinc Institute, Inc.; ^t New York Commodity Exchange; ^v Copper Institute.



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Same week last month	97.0	Same week 1931	55.3
Same week 1936	80.1	Same week 1930	81.2
Same week 1935	66.5	Same week 1929	114.1
Same week 1934	43.5		* Revised.

CURTAILED automobile production during the changeover period and a counterseasonal reduction in light construction, as represented by carloadings of forest products, were the principal factors in driving THE IRON AGE seasonally adjusted index of capital goods activity down 4.2 points to 100.0. Heavy engineering construction awards were 12 per cent above the preceding week, but when the 13-week moving average used in this series is applied to the advance, the final index figure remains unchanged. Steel ingot production, un-

changed for the third consecutive week, declined 0.3 points after applying the seasonal factor.

	Latest Week	Change from Preceding Week
Steel production (per cent of capacity)	83.0	0.0
Automobile production (number of cars and trucks)	64,200	-19,110
Railroad loadings of forest products (number of cars)	38,428	-2,918
Pittsburgh industrial production and shipments (index number)	104.5	+1.3
Construction contracts awarded (total value)	\$41,625,000	+\$4,287,000

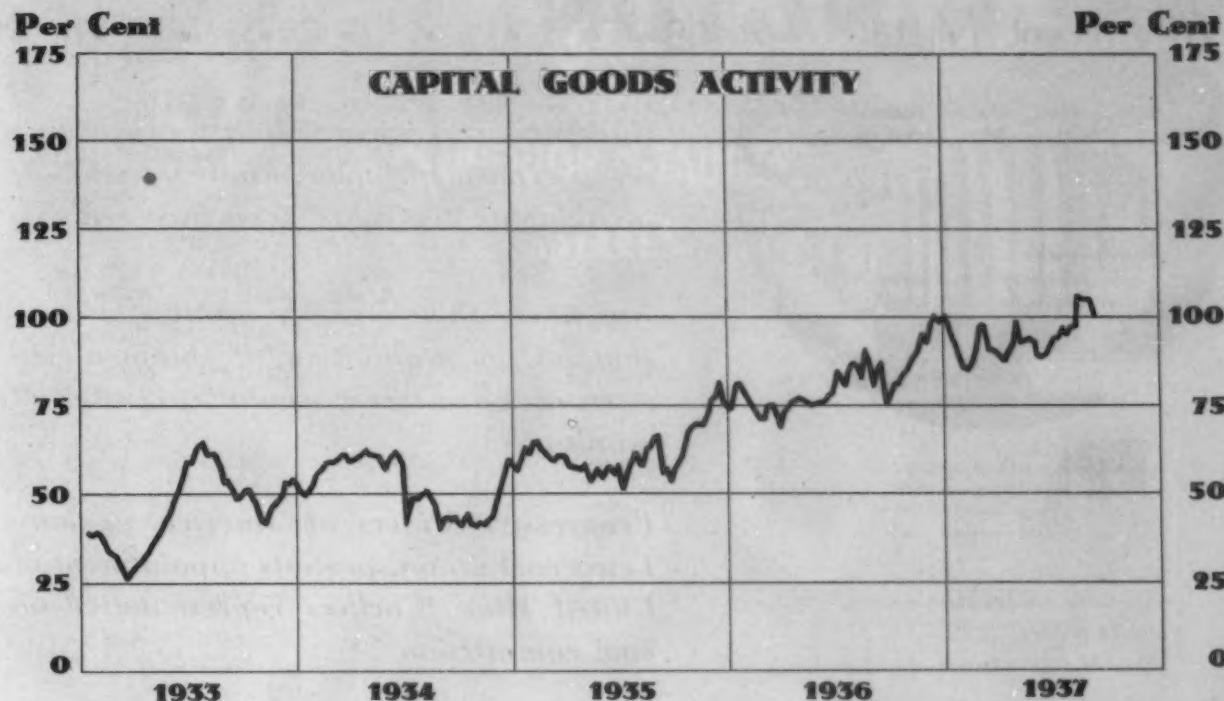
Components of The Index (1) Steel Ingot Production Rate, from THE IRON AGE; (2) Automobile Production, from Ward's Automotive Reports; (3) Revenue Freight Carloadings of Forest Products, from Association of American Railroads; (4) Industrial Productive Activity in Pittsburgh District, from Bureau of Business Research of University of Pittsburgh; (5) Heavy Construction Contract Awards, from Engineering News-Record.

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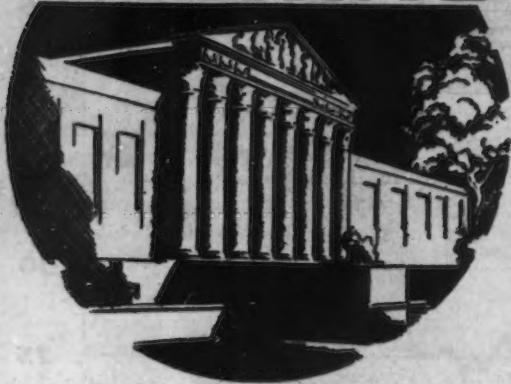
CURTAILED automobile production during the changeover period and a counterseasonal reduction in light construction, as represented by carloadings of forest products, were the principal factors in driving THE IRON AGE seasonally adjusted index of capital goods activity down 4.2 points to 100.0. Heavy engineering construction awards were 12 per cent above the preceding week, but when the 13-week moving average used in this series is applied to the advance, the final index figure remains unchanged. Steel ingot production, un-

changed for the third consecutive week, declined 0.3 points after applying the seasonal factor.

	Latest Week	Change from Preceding Week
Steel production (per cent of capacity)	83.0	0.0
Automobile production (number of cars and trucks)	64,200	-19,110
Railroad loadings of forest products (number of cars)	38,428	-2,918
Pittsburgh industrial production and shipments (index number)	104.5	+1.3
Construction contracts awarded (total value)	\$41,625,000	+\$4,287,000

Components of The Index (1) Steel Ingot Production Rate, from THE IRON AGE; (2) Automobile Production, from Ward's Automotive Reports; (3) Revenue Freight Carloadings of Forest Products, from Association of American Railroads; (4) Industrial Productive Activity in Pittsburgh District, from Bureau of Business Research of University of Pittsburgh; (5) Heavy Construction Contract Awards, from *Engineering News-Record*.

WASHINGTON.



By L. W. MOFFETT
Resident Washington Editor
The Iron Age

WASHINGTON, Sept. 7.— "What about these scrap exports to Japan?" asked an inquirer in a letter received by a Government department. "I'd like to know because I don't want to be 'bopped' on the head with my last year's automobile."

Inspired by the "undeclared" Sino-Japanese war, the query is a reflection of the heightened interest and even concern over this class of exports to Japan. The movement has been widely publicized and, since the Japanese attack on China, it is being given spectacular play almost daily in the press, as was to be expected. Writers who have protested shipments see or imagine they see vindication of their "I-told-you-so" attitude. The material was being imported, so it was stated, to be fashioned into munitions of war and the day may come when it will be turned against the United States to deal death to its people. There is no doubt that much of the material has been and is being used by Japan for armament purposes. As to the other surmise, it is to be earnestly hoped that it does not eventuate.

Exports of scrap have been given wide publication because of both their large proportions and as a material that can be quickly fashioned into death-dealing instruments. They afford an appeal to

the emotions that does not prevail with respect to the ordinary run of exported products.

Actually, however, almost every product is potentially a munition of war. And if one is to be banned, where and when is the line to be drawn? This is one of the problems which confronts the Administration and Congress in connection with legislation to license exports of iron and steel scrap. It (and the possible effect on the reciprocal tariff program) no doubt has much to do with State Department opposition to the legislation. Fear was felt it would weld itself into an endless chain. This was seen in the growing insistence that if scrap exports were to be licensed, then a similar measure should be prescribed for pig iron, semi-finished and finished steel. And if it be applied to scrap and steel, then why not to cotton and agricultural products generally? Cotton is definitely and directly a munition of war. Without agricultural products armies and civilians supporting them cannot be fed. Why not licensing for oil? Machinery and guns necessary to war cannot operate without oil. And so on without end.

But there has been particular insistence against shipments of scrap to Japan, and the movement has gained force because of strong American sentiment against that country by reason of unprovoked invasion of China. There is no

doubt that voluntary refusal by American scrap dealers to accept Japanese scrap orders would meet with widespread approval.

Neutrality Not a Simple Matter

Or the banning of shipments by the Administration under the Neutrality Act likewise would meet with a similar reception and perhaps only limited opposition. While there have been reports of prospective action of this sort, neither the President nor the State Department has commented on the matter. An offhand opinion is that no such action is contemplated. It is not a simple matter from a Government point of view. Such a step might well be decidedly not neutral. The prohibition could apply only to shipments in American vessels. Under the cash-and-carry provision Japan could, assuming she paid cash, continue loading cargoes in American ports. On the other hand, China, having no vessels, would be shut off unless she succeeded in chartering ships of other countries, the United States excepted. Obviously the United States could not apply the ban to Japan solely. Because of these and other possible complications there is serious doubt that the so-called Neutrality act will be invoked as to scrap, if at all.

What About Cotton?

But if a curb were applied to scrap what is to be said with re-

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spect to other products exported by the United States? This is particularly true of cotton. If the Government shutdown on scrap exports it is difficult to see how it could exclude cotton, etc. Will American cotton exporters cut Japan off the list? If they do they will lose a particularly large market, for Japan is a heavy importer of American cotton, no doubt using much of it for war purposes. Imports of American cotton into Japan are more than twice greater by value than are imports of American scrap into that country. For the first five months of the present year, Japan imported 697,693 bales of American cotton, valued at \$49,650,000. In the same period Japan imported 1,068,865 tons of American scrap, valued at

\$21,482,000. Exports of American cotton to China also are sizable. Shipments during the first five months of 1937 totaled 8054 bales, valued at \$545,000.

Prohibiting these shipments, therefore, would mean the loss of a large market to Southern cotton growers. Unless they were mollified under the recently enacted Cotton Loan Subsidy Act, it is not probable they would willingly submit to such an inhibition in the absence of war in which the United States itself was a participant.

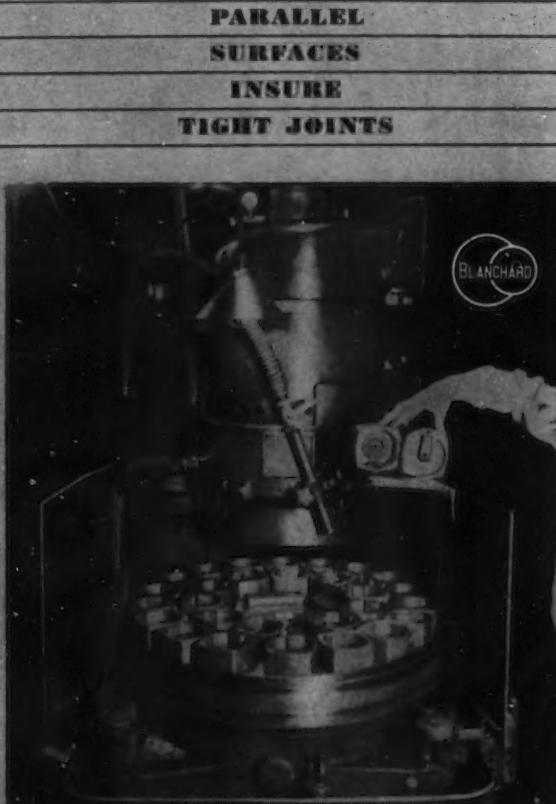
Another point made against cutting off of shipments of scrap, semi-finished and finished steel to China and Japan concerns the matter of employment. It is estimated that the collecting, sorting, handling and shipping of 1,346,641

gross tons of scrap to Japan and China—1,318,803 tons to the former and 27,838 tons to the latter country—during the first six months of the current year engaged 50,000 workers. Total scrap exports during the six-month period were 2,172,660 tons. Exports of semi-finished and finished steel to Japan and China during the six-month period totaled 415,561 tons, 345,685 tons to Japan and 69,876 tons to China, and are conservatively estimated to have engaged about 13,000 employees in their production. Japan has reduced her purchases of American scrap. Heavy takings are said to have built up a good coverage of old material and the view in some Washington quarters is that Japan for the remainder of the year will not buy American scrap on the large scale that has existed. Other countries have increased in ratio purchases of American scrap very nearly even with that of Japan. Italy is the only major consumer of American scrap that purchased less scrap during the present year than last year. England has sharply increased her purchases, taking 323,017 tons or about 15 per cent of the total scrap exports during the January-June, 1937, period. Exports of American pig iron to England also have risen sharply to 61,059 tons during the first six months of 1937 as compared with only 10 tons in the corresponding period of last year. Pig iron exports to Japan during those periods were 196,292 tons and 43 tons, respectively.

Another Union Row Finds Lewis With Cards Stacked

THE Lewis-dominated National Bituminous Coal Commission is going through the motions of allowing the Progressive Miners of America, a powerful group concentrated in Illinois and constituting the only formidable competitor of the United Mine Workers, to protest against the appointment of a UMW representative on the commission's district board for Illinois.

The incident is not a new one. The same thing occurred in 1936 when the commission, operating under the law which was later axed by the Supreme Court, named Ray Edmundson, a United Mine Worker official, as labor representative on the Illinois board. The Progressive Miners protested then as they are doing now. In other words, the same union is bringing the same grievance to the same Federal agency—increased by two members, one of whom is a UMW official from Iowa—against the appointment of the same Ray Edmundson.



Flat surfaces to secure tight joints to hold pressure are essential in machining the oil valve strainer housing shown above. A No. 16 Blanchard is doing this work, grinding two surfaces on each piece at the rate of 90 pieces, 180 surfaces per hour. The speed and accuracy of Blanchard Grinders with their ability to change quickly from one job to another gets precision work out at an unusually low cost.

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In all probability it is a useless gesture. The commission is expected to render the same decision—adverse to the Progressive Miners despite the fact the Illinois Bureau of Mines reports that out of approximately 36,000 miners about 27,000 belong to the Progressive union. However, the United Mine Workers claim a membership of 27,990 and that's all the commission needs to know on which to base its decision. Aside from raising the wrath of John L., the commission would be put in the position of reversing itself if it ruled in favor of the Progressives.

The commission likely will, as it did before, point to the 17,000 Progressive miners who are unemployed at present and rule against the PMA and in favor of UMW. While the commission cannot be blamed unqualifiedly for the failure of the coal act to provide for representation for such a substantially large group as the Progressives apparently represent, it can be blamed for its apparent failure to recognize that the two memberships are running neck and neck.

The coal act, which the commission is credited with studying with fervor, provides that employee representatives on district boards "shall be selected by the organization . . . representing the preponderant number of employees in the industry of the district in question." Unfortunately, the word "preponderant" is a little indefinite and subject to the exclusive interpretation of the coal commission. Which means that, with Lewis wielding his all-powerful bludgeon over the heads of the coal-board puppets, the Progressive miners realize they haven't a ghost of a chance.

At first blush, union representatives of district boards would seem relatively insignificant. But to the CIO generalissimo, who already has the commission itself at his beck and call, the employee members of the boards form a highly important factor of his control. A union representative is not a mere voting member of a district board but, since producer members constitute an equal number in each case, a labor member in the event of a tie-vote holds the balance of power.

Losing one link in that vast chain of Lewis henchmen would seriously cramp the style of UMW leadership and would mean loss of prestige in Illinois and throughout the country. It might prove an opening wedge in a successful membership drive for the Progressive miners.

Lewis' lieutenants can't afford to have that happen. The coal commission won't let it happen. For the coal commission, like the National Labor Relations Board, is a Lewis alter ego.

All-Steel Automobile Makes for Greater Safety

THE U. S. Bureau of Public Roads has reported to Congress that the all-steel automobile body marks a "great advance" toward greater passenger safety on the country's highways.

"The all-steel body," the bureau reports, "with its convex surfaces formed of light metal, its stiffer frame offering greater resistance to crushing and disruption, and its stronger running boards, provides much greater strength with-

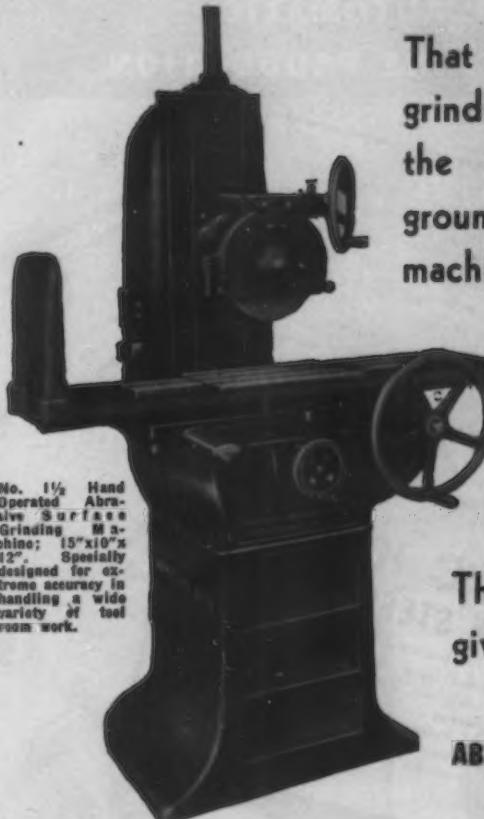
out corresponding increase in weight and is, therefore, a great advance in the direction of safety."

While recognizing that the modern streamlined body is an improvement both in appearance and reduces wind resistance over older types, the bureau's report said that "the high hood" of such bodies limits the driver's view and is "a serious defect" which could be eliminated by "placing the engine in the rear."

By the same change, the report added, occupants also could be relieved of some noise, heat and odor and the floor of the car could be lowered—all desirable features "in the interest of safety."

It was pointed out, however, that "satisfactory maneuverability of the car requires an almost equal

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distribution of weight to the front and rear wheels, and to accomplish this in a rear-engine car of reasonable wheelbase will require an engine about half as heavy as present units." Such a rear-engined car with "acceptable handling characteristics" must await powerplant and drive developments, according to the bureau.

These views were included in a section on automobile design in the recent highway safety and traffic report sent to Congress shortly before adjournment.

Lewis' Radio Speech So Vitriolic That Broadcasting Company Censors It

WASHINGTON, Sept. 7.—While characteristically pontifical and ponderous, John L. Lewis in his rabble-rousing radio broadcast last Friday night was unusually Napoleonic as he boldly warned the President in thinly disguised words of hot anger of political reprisal for what

Lewis affects to consider failure to keep faith with labor, by which Lewis meant his own CIO.

Lewis had in mind the President's refusal to intervene directly in the steel strike. He did not mention the President's name or office but there was no doubt that the inference was directed at Roosevelt.

Swept into his torrent of threatened punishment were the Democratic party and lesser figures in the political firmament, Governor Martin L. Davey of Ohio and Mayor Edward Kelly of Chicago. Davey was viciously assailed for calling out the Ohio National Guard to protect Republic's Ohio plants and workers against SWOC attacks. Kelly was roundly scored for calling out Chicago police to protect Republic's South Chicago plant and workers. The Columbia Broadcasting Co. eliminated one bitter item in the Lewis manuscript about Governor Martin L. Davey and a vicious paragraph about Chairman Tom L. Girdler of Republic Steel Corp.

In his bitter outpouring of detraction Lewis succeeded in characterizing Governor Davey as the "steel puppet." Removal of the venomous literary monstrosity about Mr. Girdler left Lewis without any reference to the Republic head, whom Lewis had specifically singled out from the steel industry as the object of abuse.

The speech, advertised in an advance press notice as "An exposure of the forces arrayed against labor in the strike of the Steel Workers' Organizing Committee against the independent steel companies," was notable only for its excessively vitriolic substance so far as the SWOC strike was concerned. In raging tones and words, Lewis repeated distorted charges and claims. Steel executives were held up as ogres who were prepared to "crush labor" at any cost and by any means. Strikers were represented as defenseless victims, shot and beaten by the forces of law without any justification.

Attack on Davey Ironic

No mention was made of the fact that armed strikers had formed themselves into mobs and, despite warning, attempted to rush upon steel plants and non-strikers; had dynamited railroad track to prevent delivery of mail and food-stuffs to strike-affected plants and otherwise engaged in unrestrained violences. In this connection, the

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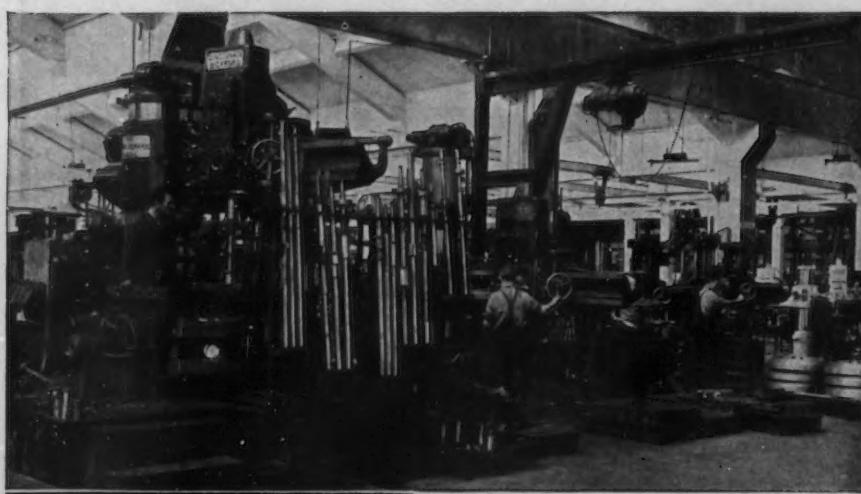
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Lewis' attack on Governor Davey was ironic inasmuch as the Governor had called out the Ohio National Guard at the request of SWOC which had warned of a "terrible slaughter" unless such a step was taken.

Lewis, of course, was enraged that, despite the support he had received at the hands of Federal and State authorities, they did not sell out to him bag and baggage in return for heavy CIO financial contributions in the last Presidential campaign. In his self-assumed role

of a Napoleon, he demanded complete rule or ruin.

Hotly resentful that he was balked in his steel organizing campaign, Lewis turned upon the President for not coming to the aid of CIO and served notice by implication that the Roosevelt Administration must continue its fealty to the mass labor movement or be confronted with political consequences. Next year, Lewis pointed out, labor "must determine who are its friends in the arena of politics as elsewhere."



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This Cincinnati Bickford Radial is but one of seven used by this nationally known shaper manufacturer to speed production and insure accuracy with the least possible effort.

Repeat orders from this alert machine tool builder are evidence of the superiority of the Super-Service Radial. Let us show you why it lasts longer and produces faster. Write for latest catalogs.

(left) A brand new 3' High-Speed, All-Gear Super-Service Radial just installed in the Gould & Eberhardt shop.

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Unmistakably rankled because of the President's "A plague o' both your houses" statement when he referred to the break-up of the steel strike negotiations before the Steel Mediation Board, Lewis broke forth with the following colorful rhetorical allusion to the President, perhaps having in mind the \$500,000 contribution to the New Deal cause:

"It ill behooves one who has supped at labor's table and who has been sheltered in labor's house to curse with equal fervor and fine impartiality both labor and its adversaries when they become locked in deadly embrace."

Lewis' much-advertised "important policy announcement for the first time" was seen in his purring words by which he urged a coalition of labor and farm groups.

This prompted Senator Burke, Democrat, of Nebraska, to observe that Lewis will "meet the biggest disappointment of his career if he attempted to organize farm workers." The Senator said that opposition to Lewis would be "an aid to any candidate in a farm region." Burke added that he would be interested "in hearing what the White House has to say about this one," alluding to Lewis' thinly veiled remarks about the President.

At the same time the Senator seemed to suspect that both the President and Lewis were shadow boxing. Burke expressed belief both were "willing to let it appear that the split between them is worse than it really is."

John P. Frey, president of the Metal Trades Department of the AFoL, militantly anti-CIO, said Lewis was trying to "bulldoze" the President.

"It would be astonishing if he could get away with it," Frey said. "It's just a continuation of Lewis' effort last spring to force the President to support the CIO because the CIO supported Mr. Roosevelt in the election."

The Lewis speech was described by Frey as being "more remarkable for its collection of adjectives than for any thought behind it. It is just another step in Lewis' campaign to make Labor's Non-Partisan League the CIO political organization. In regard to the CIO bid for farm support, Lewis appears to be trying to work both sides of the fence, appealing to both farmers and the men who work for them."

Lewis served notice that the SWOC drive to organize steel will be continued. He produced exaggerated figures in giving SWOC membership in steel plants which SWOC has organized. He said that

85 per cent of the steel industry is under contract and that wage contracts have been negotiated with 399 steel companies covering 510,000 men. Lewis apparently includes in his figures all sorts of metalworking plants since there are not 399 steel companies in the country. The Bureau of Labor Statistics lists 291 steel plants. Obviously, the CIO has not organized 85 per cent of the steel industry.

Bitter arraignment of the CIO was made by President William Green of the AFoL in a Labor Day broadcast before a mass meeting of the Dallas Central Council, Dallas, Tex. Green denounced the "destructive policy of the CIO and its leaders in splitting the forces of organized labor, in sponsoring sit-down strikes, in encouraging communistic support and in subordinating the welfare of the workers to political ambitions.

Green made the following points:

1—The federation stands as a barrier to any communist advances in labor's ranks. The CIO welcomes communist support and uses its methods.

2—The federation condemns sit-down strikes, a CIO weapon, as illegal and likely to pave the way to a "Fascist dictatorship."

3—The federation will remain non-partisan politically. "Its officers are not seeking political preferment. They are not moved by a consuming ambition to establish themselves as political dictators."

4—The federation opposes incorporation of unions. Its record of responsibility and keeping obligations, except for the "deplorable record of the CIO," might well be envied by other organizations.

5—The federation has sought to compose differences and restore the united family of labor, but all such efforts have been spurned by the CIO.

If it were not that she is so serious-minded, one would have suspected Madam Secretary of Labor Frances Perkins of indulging in satire in her Labor Day broadcast when she said that the National Labor Relations Act "is now working toward the achievement of just and harmonious relations in industry." It was generally a New Deal political tirade of gushing optimism over the so-called "continuing improvement of our economic order . . . for five consecutive years now."

Contract for the dismantling of the historic Lucy blast furnace of the Carnegie-Illinois Steel Corp. and the Farrell, Pa., plant of the American Steel & Wire Co. near Sharon, have been let to the United Iron & Metal Co., Southside, Pittsburgh. The dismantling of Lucy furnace involves about 10,000 tons and the Farrell plant about 6000 tons.

Yearbook Issued By Tin Council

THE annual yearbook of the International Tin Research and Development Council, recently published, shows that the United States is the largest producer of tin plate, accounting for 53.8 per cent of the world output. The book also states that at present

there are 17 American producers operating 28 plants with a total annual capacity of 2,574,000 gross tons.

200 Pages of Historical Data

The yearbook contains 200 pages of historical data and statistics pertaining to the consumption and production of tin, and is available from the council at 149 Broadway, New York, at a cost of \$1.50.



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Iron and Steel Exports Approach 1917 Level; Pig Iron Outstanding in July With 168,538 Tons; Scrap Outgo Lower, 2,600,707 Tons in Year To Date

WASHINGTON, Sept. 8.—For the first time in 20 years, the iron and steel export trade of the United States (excluding scrap) has very closely approached the 1917 monthly average of shipments, according to a preliminary report issued by the Commerce Department's Metals and Minerals Division, headed by R. L. Harding. In July, 461,391 gross tons, valued at \$26,489,190, were shipped to foreign markets, and from the standpoint of volume fell only 60,987 tons (11.7 per cent) short of the 1917 monthly average of 522,378 tons. The nearest approach to the 1917 level had been previously attained in 1918, when the monthly average stood at 447,522 tons.

In 1917, a grand total of 6,268,546 tons of semi-finished and finished iron and steel products left this country for consumption in overseas markets. That volume was the highest recorded in the 1901-1936 period, and, in all probability, the peak annual level of shipments in the history of the United States export trade in those materials.

Sharp Gains Over June

In comparison with June, 1937, exports (306,281 tons, valued at \$17,900,048), the July totals registered sharp gains of 50.6 per cent in quantity and 48 per cent in value, and against the totals of July last year (98,991 tons valued at \$7,161,426) very striking increases of 366.1 per cent and 270 per cent respectively occurred.

In the first seven months of 1937, the cumulative export total was 1,831,424 tons, valued at \$112,376,553, against 653,628 tons, valued at \$48,555,857, in the corresponding period of 1936—outstanding increases of 180.2 per cent in quantity and 131.4 per cent in value.

Pig iron in July continued to lead as the principal product shipped, from the standpoint of tonnage. Its total was 168,538 tons and represented the highest monthly shipment of the current year, comparing with 105,194 tons in June and 125 tons in July last year. Japan and the United Kingdom, as in former months, were the outstanding purchasers.

Next in importance were steel ingots 46,318 tons (19,753 tons in June; 4215 tons in July, 1936), followed by plate 48,121 tons (32,756 tons and 6679 tons). Then was tin plate 34,439 tons (23,207 tons and 16,010 tons), with black steel sheets 32,144 tons (25,029 tons and 16,088 tons) next. Plain structural shapes were fifth in importance in a trade aggregating 22,379 tons (11,623 tons and 5644 tons). Steel bars ranked sixth with an 18,950-ton total comparing with 12,670 tons in the previous month and only 4400 tons in July, 1936.

Pig Iron Outstanding

In the first seven months of this year the trade in pig iron was outstanding, shipments aggregating 474,389 tons (1049 tons in the corresponding period of 1936). Rank-

ing next was tin plate 184,097 tons (147,716 tons), with plate 187,288 tons (36,714 tons) following. Black steel sheets with a 155,189-ton total (81,875 tons) came next, and in turn were followed by the exceptionally high trade in steel ingots which totaled 109,039 tons (11,098 tons). Plain shapes ranked fifth with a total of 72,083 tons (31,217 tons). Sixth in importance were steel bars 80,358 tons (30,177 tons).

Against the trade in June, some very sharp increases were registered in individual products, the outstanding one being in pig iron, which stepped up 63,244 tons, or 60.1 per cent. Then the gain in the steel ingot total was 26,563 tons—134.5 per cent, followed by those in plate (15,365 tons—46.9 per cent), tin plate (11,232 tons—48.4 per cent), plain shapes (10,756 tons—92.5 per cent), black steel sheets (7115 tons—28.4 per cent), and steel bars (6280 tons—49.6 per cent).

In the first seven months of the current year, it is interesting to note that in every export product with the exception of one—riveted iron and steel pipe and fittings—a comfortable margin of gain was registered over the individual totals reached in the corresponding period of 1936. The outstanding increase (473,340 tons—450 per cent) resulted in the pig iron export trade, others of moment occurring in shipments of ingots (97,941 tons—88.3 per cent), plate (150,574 tons—410.1 per cent), plain shapes (50,866 tons—162.9

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per cent), steel bars (50,181 tons—166.2 per cent), and tin plate (36,381 tons—24.6 per cent).

Scrap Exports Lower

Exports of scrap during July totaled 428,047 tons, valued at \$8,931,694, and, although remaining at a very exceptional level declined (17.7 per cent in volume and 14.9 per cent in value) when compared with the June trade (520,297 tons valued at \$10,493,433). Against the July, 1936, totals (196,887 tons, valued at \$2,461,753), however, pronounced increases of 117.4 per cent in quantity and 262.8 per cent in value resulted. The cumulative total for scrap in the first seven months of 1936 was 2,600,707 tons, valued at \$51,957,619, reaching the

highest level in the history of scrap shipments from the United States and, at the same time, registered striking increases of 105 per cent in quantity and 234.9 per cent in value against the trade which resulted in the like period of 1936.

\$37,500,000 Water Project to Go Ahead

A \$37,500,000 water power and navigation project in South Carolina, which has been held in abeyance through litigation, will now go ahead, a favorable decision having been handed down by Judge

J. Lyle Glenn at Columbia, S. C. The plan involves the deepening of the Cooper River and improving Charleston harbor, into which it flows, which may revive water transportation between Charleston and Columbia. Two companion dams will be built to develop power and divert water from the Santee River into the nearby Cooper River. The Santee dam will create a lake about 35 miles long and supply water for the power plant, while the other dam will further control the flow in the proposed canal and diversion of water into the Cooper River.



TRADE NOTES

Pittsburgh Tool-Knife Mfg. Co., Pittsburgh, has moved into its own newly equipped plant at 75-81 Sycamore Street, Etna P. O., Pittsburgh. A new office building has been erected adjoining, and the main two-story plant is entirely devoted to the production of metal cutting saws, rivet sets, paper knives, chisel blanks and inserted tooth saws.

Reed-Prentice Corp. will handle the sales of plastic injection molding machines direct in the New York territory from its office at 75 West Street, New York. George W. McIntyre is manager.

Manufacturers & Fabricators, Inc., was recently formed for the manufacture and fabrication of anything in iron or steel. The plant is located at 4389 Martin Avenue, Cleveland.

Westcott Chuck Co., Oneida, N. Y., has appointed J. C. Harvey special representative to cooperate with distributors in various territories. Mr. Harvey has had wide experience in both machine shop and sales fields.

Federal Bronze Products Co., manufacturer of brass, bronze and aluminum castings, also finished bronze bushing and bars, recently moved from Maplewood, N. J., to 305 Coit Street, Irvington, N. J.

Babcock & Wilcox Tube Co., Beaver Falls, Pa., has appointed the Uhrich Supply Co., 914 Central Street, Kansas City, Mo., as distributor of B&W seamless boiler tubes in the Kansas City trade territory—western Missouri and Kansas.

Fabricated Plate Orders Decline

NEW orders booked in July for fabricated steel plate, as reported by the Bureau of the Census, amounted to 26,854 tons, compared with 34,833 tons in June, 60,324 tons in July, 1936, and 18,890 tons in July, 1935.

Small Hole Grinding



Mounted wheel held in chuck grinding small bore with spindle turning at 35,000 r.p.m.



THE Rivett No. 104 Grinder is designed to meet demand for a small hole grinder suitable for precision tool making and accurate manufacturing. It may be used as a single purpose machine in efficient production or readily and rapidly set up for the many varying requirements of the toolroom. Correct in proportion and design the extremely high spindle speeds necessary for small

hole grinding can be maintained within the required limits absolutely free from vibration.

Although primarily an internal grinder, an external grinding attachment can replace the internal spindle bracket. The Rivett fixed diamond method is used for truing both internal and external wheels. For further information write for bulletin 104-C.

RIVETT LATHE & GRINDER INC.
BRIGHTON, BOSTON, MASS.



...OBITUARY...

WILLIAM E. ACOMB, for 21 years superintendent of the American Steel & Wire Co. plants at Waukegan, Ill., died suddenly Aug. 28 of a heart attack, aged 57 years. His connection with the company began in 1905 when he was employed as assistant to the superintendent of the Allentown works of the company. He was appointed assistant superintendent of the Rankin works in 1906, the following year was transferred to Donora as assistant superintendent of that division and later was made superintendent of the Donora works. He remained at this post until he was transferred to Waukegan as superintendent in 1916. Prior to his employment by the American Steel & Wire Co., Mr. Acomb was employed as a draftsman by the Oliver Iron Mining Co. at Duluth, another subsidiary of the U. S. Steel Corp. He was born in Detroit, educated in that city's grammar and high schools and was graduated from the University of Minnesota with an engineering degree.

* * *

E. J. PARKER, who had been identified with the Morgan Engineering Co., Alliance, Ohio, for 43 years, died at his home in Forest Hills, N. Y., on Aug. 24, aged 58 years. He was first identified with the company in the engineering and sales departments at Alliance and for the past 30 years had been New York district sales manager.

* * *

OSCAR TEXTOR, retired founder and president Textor Chemical Laboratories Co., Cleveland, research chemist and metallurgist, died Aug. 31, aged 77 years. After graduating from the University of Michigan in 1881 he taught chemistry and metallurgy at the University for two years and then became chief chemist for the Cleveland Rolling Mill Co., which was later merged with the American Steel & Wire Co. He founded the Textor Laboratories in 1895 and was active in the business until 1933 when he retired because of ill health. He was the last surviving charter member of the Cleveland Section of the American Chemical Society, of which he was secretary for many years.

* * *

EDMUND H. JONES, noted inventor in the fireproof metal building materials industry, died at his

home in Milwaukee on Aug. 29, aged 74 years. He retired a year ago as manager, fireproof division, Milcor Steel Co., Milwaukee, which firm he joined in 1917 after many years of service as general manager of the Northwestern Expanded Metal Co., Chicago.

Railroad Installs Fast Unloading Crane

A GIANT new crane, which can unload bulk cargoes from ships into railroad cars at the rate of 280 tons an hr., four times the speed of ordinary ship's gear, has just been completed and placed in operation by the Norfolk & Western Railway at its Sewalls Point

(Norfolk), Va. piers. It was built at a cost of approximately \$75,000.

Electrically operated throughout, the crane is specially designed for the speedy transfer of ore, sulphur, nitrates, logs and other heavy commodities. The facility can remove iron ore from vessels at the rate of 280 tons an hr., nitrates at 250 tons an hr. and sulphur at 200 tons per hr.

Standing 83 ft. high, the lifting structure is built of steel framework which supports an apron extending 34 ft. beyond the face of the pier. A runway and trolley, built on the apron, carries a clamshell bucket with a lifting and carrying capacity of approximately 6000 lb. A hopper and chutes permits the transfer of commodities from ships into both box and open-top cars.

STARRETT DIAL INDICATORS FOR EVERY REQUIREMENT



IN THE TOOL ROOM

On special tool and gauge work, for setting up jigs and fixtures — in fact, for any work that calls for instant, accurate readings or frequent comparison. The Starrett No. 665 Dial Test Indicator shown here checking an angle gauge is one of a complete line of STARRETT Dial Indicators. The other Starrett Tools are Micrometers No. 224, Universal Level Protractor No. 360 and Toolmaker's Clamp No. 161.

IN THE SHOP

A Starrett No. 25-T2 Dial Indicator checking the setting of teeth in a Hypoid Gear Cutter — one of hundreds of applications in which Starrett Dial Indicators are set up on machine tools, production jigs, fixtures, etc.

ON THE INSPECTION BENCH

For quick, accurate inspection of duplicate parts. A Starrett No. 25-A Dial Indicator set up in a special fixture for setting thread checkers, indicators can be furnished with Revolution Counter, Tolerance Heads, Shock Resisting Mechanism and similar features when required.

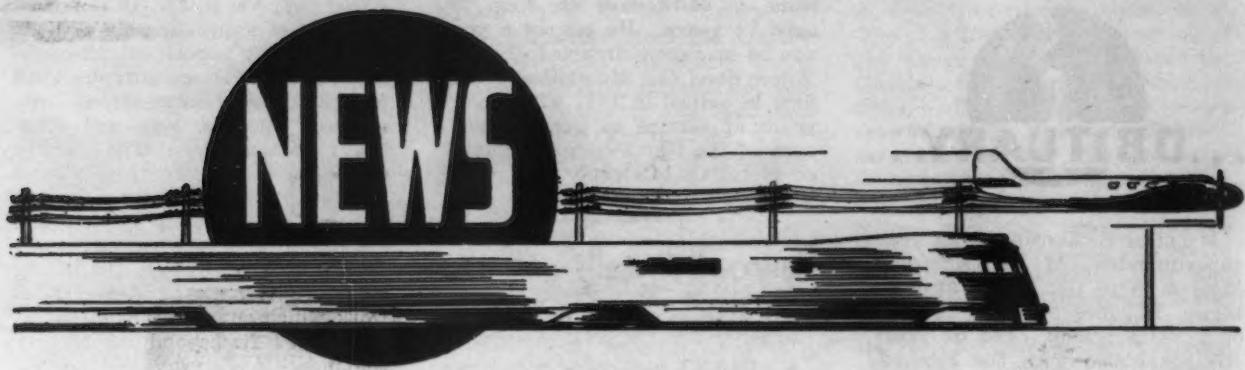
Starrett Dial Indicator Catalog AA (Second Edition) illustrates and describes the entire line of STARRETT and LAST WORD Dial Indicators. A copy sent free on request. Write for it.

THE L. S. STARRETT CO., ATWOL, MASS., U.S.A.

World's Greatest Toolmakers—Manufacturers of Hacksaws Unexcelled—Steel Tapes, Standard for Accuracy
Dial Indicators for Every Requirement

Standardize on

BUY THROUGH YOUR DISTRIBUTOR



American Steel & Wire Co. Adopts New Selling Plan for Wire Products

THE American Steel & Wire Co. has announced a new sales plan applying on nails, staples, barbed and barbless wire, annealed and galvanized merchant quality wire, woven wire fences of all kinds (exclusive of lawn fence) and bale ties, superseding the jobber-dealer plan long in vogue.

Effective Sept. 2, these products will be sold on a quantity plan which is being sent out to the trade.

The quantity plan for merchant products covering nails, staples, barbed and barbless wire, annealed and galvanized merchant quality wire, woven wire fence of all kinds (exclusive of lawn fence) and bale ties, is as follows:

Mixed carloads, 40,000 lb. or more: Base.

Less than carload extras: The following quantity extras apply on all individual less than carload orders for shipment for producing mill ware-

house stock. Total weight determine l.c.l. extras:

20,000 lb. to carload, 10c. per 100 lb. or 2 columns.

5000 lb. to 19,999 lb., 15c. per 100 lb. or 3 columns.

1000 lb. to 4999 lb., 30c. per 100 lb. or 6 columns.

Less than 1000 lb., 50c. per 100 lb. or 10 columns.

From the prices applying to less than carloads, straight or mixed carloads or more purchased for resale there is granted dealers and jobbers a functional allowance of 10c. per 100 lb.

In addition the new plan incorporates quantity deductions applying to all purchases. These deductions apply to quantity of product or products of any one group ordered by one purchaser released for shipment at one time to one destination. The deductions range from 5c. to 15c. per 100 lb. on nails and staples, and on fence wire, merchant quality, annealed and

galvanized, wire and brace wire, 5c. to 15c. Quantity discounts also apply on barbed wire and on fencing, cribs and cribbing, square mesh field and poultry wire.

In event a sufficient quantity of a product or products of any of the groups carrying quantity deductions is purchased to secure deduction, products of other groups may be included and will take the deductions of the same tonnage bracket.

Single loop bale ties in mixed carloads of 40,000 lb. or more take present base price. L.c.l. extras are as follows:

20,000 to 39,999 lb. 2 column

5000 to 19,999 lb. 3 column

1000 to 4999 lb. 6 column

Less than 1000 lb. 10 column

Quantity deductions:

40,000 to 59,999 lb. 2 column

60,000 to 79,999 lb. 3 column

80,000 or more lb. 4 column

From the prices applying to less than carloads, straight or mixed carload or more purchased for resale there is granted dealers and jobbers a functional allowance of 10c. per 100 lb.

Abandonment of the jobber-dealer method of selling by the

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nothing
MORE CONSTANT
 THAN A BEAM OF LIGHT ●

THE theory of the rectilinear propagation of light announced by the great physicist Huyghens, 200 years ago, stands unchallenged for purposes of optical measurement. The constant fidelity of a beam of light is utilized in the Sheffield Visual Gage to multiply gaging element movement up to 10,000 times or more.

The electric lighting current used by the Sheffield Visual is employed only to produce a beam of light. This beam, traveling at practically 300,000 k. m. per second, has no weight, regardless of length, and may, therefore, be used to measure with mathematical precision.

The movement of the gaging element is amplified by the Sheffield Reed Mechanism. The displacement of the Reed Pointer is further magnified optically—the beam of light casting the pointer's shadow on the illuminated dial of the gage.

Thus the Sheffield Visual is essentially a light gage with all the precision of light beam measurement.

The Sheffield is easy to set up and rapid in operation. It is highly sensitive without being delicate. It is deadly accurate and constitutes the cheapest means of obtaining such accuracy.

Write for Full Details

MASTER GAGEMAKERS



Visual Gage
Mag. 5,000



Visual Gage
Mag. 2,000



Visual Gage
Mag. 1,000



Electric
Gage

SHEFFIELD GAGE CORPORATION

DAYTON - OHIO - U.S.A.

American Steel & Wire Co. results after due deliberation of the problem had convinced the company that continuation of the plan was not in the interest of either the company's customers or the company.

The new quantity plan does not apply to products such as posts, American lawn fence, gates, poultry netting or any other products, except those mentioned.

This method of selling has been in effect in territories normally served by the Tennessee Coal, Iron & Railroad Co. over recent months and had proved satisfactory. The plan of the American Steel & Wire Co. follows closely that of the Tennessee Coal, Iron & Railroad Co. with the exception that the first bracket of the T.C.I. is based on the railroad minimum and not on 40,000 lb. as is the case with the American Steel & Wire Co.

By Jan. 1, 1938, the capacity of the U.S.S.R. rolling mills will be approximately 20,400,000 metric tons annually, according to the *Iron and Steel Fortnightly*, published by the Department of Commerce.

China Places Large Steel Orders In Czechoslovakia and Austria

HAMBURG, Germany (*Special Correspondence*).—China has placed orders for iron, steel, arms and ammunition amounting to £10,000,000 in Czechoslovakia and £1,100,000 in Austria on a seven-year credit basis. The German industry declined to participate in this business, considering the risk too great. If Japan blockades the China coast or the Nanking Government gets into financial difficulties, the risk for such a small country as Czechoslovakia is extraordinary. China paid from 18 to 25 per cent above current export prices for railroad materials and motor cars.

July was the record month in steel production for Germany, while foreign trade was the best since 1930. Exports were mainly in finished steel, which constituted 94 per cent of total exports in Germany against 63 per cent in Belgium-Luxemburg and 58 per cent in France. Only 0.7 per cent

of pig iron production and 0.48 per cent of semi-finished steel output is exported.

German mills have reopened their books for ship plates after an absence of three months from the export market. The price quoted is £16 12s. 6d. (paper), which Dutch and Scandinavian shipyards say is exorbitant and is killing the boom in shipbuilding. The export ship plate price is about 31 per cent higher than the domestic price, whereas early in 1936 it was 28 per cent below the domestic price.

Germany has contracted for 1200 tons of American ferrocobalt, ferromolybdenum, ferrochrome, ferrontitanium, ferrovanadium and ferrosilicon (75 per cent). This is the first transaction of its kind in post-war years.

Reports that three large iron and steel plants will be built in Germany by the Eisenwerke Hermann Göring have not been officially confirmed, although it is

New 6" x 6" PEERLESS Improved HIGH DUTY METAL SAWING MACHINE

Automatically feeds the bar of stock forward to the gauge, automatically closes the vise, and automatically continues to repeat the complete cycle of cutting until the entire bar is cut to the length the gauge is set for, all without the attention of an operator.

The three speed sliding gear transmission — crankshaft — balance lever and trunnion blocks are fully ball bearing equipped.

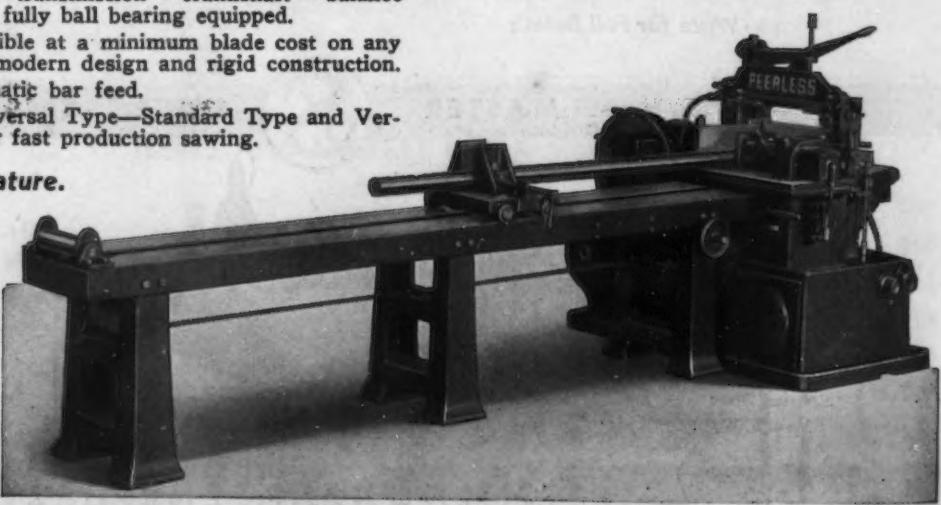
The fastest cutting time possible at a minimum blade cost on any kind of metal because of its modern design and rigid construction. Also furnished without automatic bar feed.

Also—Peerless Improved Universal Type—Standard Type and Vertical Type in various sizes for fast production sawing.

Write for complete literature.

PEERLESS
MACHINE
COMPANY
RACINE, WISCONSIN

with Hydraulically Operated
Automatic Bar Feed



known that the cooperation of the Anglo-American firm of Brassert & Co. has been obtained for the construction work. It is probable that the work will not be started until the expansion of production of low-grade iron ores has attained sufficient volume.

The object of the Government is not to produce more iron, but to expand the production of ore. In the meantime new plants will be constructed by the steel companies themselves. During 1934-1936 only a few permits were granted to expand production facilities. Now that the raw material basis has been ascertained, this ban has been partially lifted. The Oberhausenworks of the Gutehoffnungshütte, Germany's second largest steel plant, is to spend 20 million marks for a new iron and steel plant. Klöckner and Hoesch are to follow. Expansion of production, however, will be under Government control so that overexpansion may be avoided.

Sun Machinery Co., Inc., Newark, N. J., formerly at 115-121 Hanford Street, has moved to 36 Van Vechten Street.

Metallurgical Topics At Gear Meeting

THREE or more addresses devoted to metallurgical problems have been planned for the semi-annual meeting of the American Gear Manufacturers Association, to be held at the Spink-Wawasee Hotel, Lake Wawasee, Ind., Sept. 20-22.

They include: "Torch Hardening Method for Gears," by W. E. Sykes, Farrel-Birmingham Co., Inc., Buffalo; "Relation Between Microstructure and Machinability of Gear Steels," by Dr. N. E. Woldman, Eclipse Aviation Corp., and "Roller Tests to Determine Pitting and Fatigue Strength," by Dr. Stewart Way, Westinghouse Electric & Mfg. Co.

The program also includes a discussion of electric motors for motorized speed reducer applications, by L. R. Botsai, Westinghouse Nuttall works; a paper on "Valuation of Jobs Based on Community Rates," by A. S. Crockett, General Electric Co., and an address on "The Credit Situation," by Paul Fielding, National Credit Associa-

tion. The relation of the A.G.M.A. to other associations will be discussed by T. R. Rideout, Westinghouse Nuttall Works, and chairman of the A.G.M.A. general standardization committee.

Coke Output Gains 9.5% in July

TOTAL production of coke in July was 4,707,106 net tons, an increase of 9.5 per cent over the previous month's total of 4,298,559 tons, according to the Bureau of Mines. Beehive production in July totaled 285,000 tons, compared with 274,300 tons in June. The aggregate output for the seven months of the current year is 32,226,934 tons, or 7,113,934 tons over the total of a comparable period in 1936.

Stocks at by-product plants continued to rise, the total on hand at the close of July amounting to 2,008,552 tons, or 9 per cent in excess of the June reserves. The bulk of the increase was at merchant plants, where stocks rose 11.7 per cent.

MURCHEY THREADING MACHINES NO. 11 AND NO. 22



No. 11 SINGLE OR DOUBLE HEAD

Murchey No. 11 cuts machine threads $\frac{1}{4}$ " to 1" and pipe threads $\frac{1}{8}$ " to 1". Travel of carriage 6" or 14". Motor speed 1800 R.P.M.
Single head No. 11 machine requires only 26" x 72" floor space and weighs 2600 lbs.
Double head No. 11 machine requires only 49" x 72" floor space and weighs 4000 lbs.

Standard Equipment: Wrenches, Pumps, Off Guards, Die Heads and Opening and Closing Yokes.
Murchey No. 11 and No. 22 Threading Machines Use Tangential Chaser Die Heads.

GREATER PRODUCTION

BETTER WORK LONGER LIFE

LOWER COSTS LESS FLOOR SPACE

Murchey Tangent Chasers give cool, free cutting action. Simple, centralized controls and accessible lead screw "change gears" make operation convenient and fast. All gears and bearings submerged in oil to minimize friction and save power. Concealed motor. Removable pump. High carbon alloy steel lead screw, if desired, correctly threaded to insure accuracy and straightness. Tough alloy steels threaded at production speeds. Indicator tells exact spindle speed, which is adjustable without changing gears.

No. 22 SINGLE OR DOUBLE HEAD MACHINE

Murchey No. 22 cuts machine threads $\frac{1}{2}$ " to 2" and pipe threads $\frac{1}{2}$ " to 2". Travel of carriage 6" or 14". Motor speed 1800 R.P.M. Requires only 53" x 74" floor space.

MURCHEY MACHINE & TOOL COMPANY
DETROIT, MICHIGAN

Collapsible Taps; Self Opening Die Heads; Bolt Threading; Pipe Threading and Pipe Cutting Off Machinery



.PERSONALS..

THOMAS M. GALBREATH and DAVID B. CARSON have been elected vice-presidents of the Sharon Steel Corp., Sharon, Pa. Mr. Galbreath has been general manager of sales since 1934 and will continue in that

the Tacony Steel Co. Three years later he became assistant general manager of sales of the Central Steel Co. and, after the combination of Central Steel and United Alloy, Mr. Carson was placed in charge of all research development and stainless steel sales. When the Associated Alloy Steel Co. was organized in 1930 by Sharon, Ludlum and Timken, Mr. Carson was elected vice-president and general manager, in which capacity he continued until the company was dissolved in 1933. He then went with the Sharon company as manager of the stainless steel division.



ANGUS G. SCOTT has been appointed manager of line material

activities for the Westinghouse Electric & Mfg. Co., East Pittsburgh, a newly created department specializing in line materials for mining, street railway systems, and heavy electrifications. Mr. Scott formerly was superintendent of power distribution for Cleveland Railways. He will be located in East Pittsburgh. Mr. Scott received his degree from the Case School of Applied Science in 1921. In 1923 he entered the employ of the Cleveland Railway in the line division and three years later was promoted to assistant superintendent. In 1930 he was appointed superintendent of power distribution, which position he held until his present connection with Westinghouse.



T. M. GALBREATH

capacity along with his new duties as vice-president. He was graduated from Yale University in 1915 and enlisted in the aviation division of the Army early in 1917. Upon his return to civilian status after the war, he became identified with the Sharon company and spent some time in the mills and general office. He was later made manager of the Philadelphia sales office, then moved to Cleveland in charge of that district. In 1928 he returned to the home office of the company as assistant general manager of sales and six years later was made general manager of sales.

Mr. Carson was graduated from Ohio State University in 1913 and entered the steel industry with the Carbon Steel Co., Pittsburgh, in 1915. After serving with the Ordnance Department, he returned to the Carbon Steel Co., from which he resigned in 1920 to become Cleveland district sales manager of

A COMPLETE LATHE... JONES & LAMSON



When considering the purchase of new turret lathes one should ask this question, "Am I buying modern turret lathes which will retain their earning power for many years?" The standard J&L Turret Lathe includes all the features required to make a complete turret lathe completely modern—features which assure long lived earnings. Standard features on J&L Turret Lathes include:

1. Single lever speed selectors.
2. Single lever feed selectors for carriage and saddle.
3. Positive stops for all feed disengagements on carriage and saddle.
4. Power traverse and power indexing for turret on Saddle Type machines.
5. Triple purpose hardened steel ways.
6. Full length stationary way covers on Saddle Type machines.
7. Automatic distribution of cutting coolant through turret to the cutting tools.
8. Only twelve points of lubrication.
9. Force feed lubrication to all carriage and saddle parts not lubricated with the splash system.
10. Spindle speeds from 20 to 1000, or from 30 to 1500 R.P.M. with a constant speed motor.

All J&L Universal Turret Lathes have all of the above features. These features have helped the J&L Universal Turret Lathes set a new high for earnings per dollar invested in turret lathes.

JONES & LAMSON MACHINE CO.

G. HOWARD BODDY, whose offices are in the General Motors Building, Detroit, has been appointed by the Blaw-Knox Co., Pittsburgh, as its representative to handle engineering and sales of the products of the Power Piping Corp., a subsidiary. Mr. Boddy will also handle sales of some of the company's other industrial products in the Detroit territory, although Blaw-Knox construction equipment will continue to be sold through its distributor, WILLIAM P. FAVORITE, 6561 East Seven Mile Road, Detroit.

* * *

E. T. BUTLER, who has been, since last April, assistant to the manager of the Ore and Coal Exchange, Cleveland, has been ap-

pointed manager of the exchange, succeeding HERMAN M. GRIGGS, who recently retired. The exchange is maintained by the railroads for expediting rail movements of ore and coal. A. P. MCGRATH, secretary Railroad Operating Committee, has been appointed secretary of the exchange, assuming duties formerly performed by Mr. Butler. After receiving early transportation training in railroad offices in Youngstown, Mr. Butler was employed in the Traffic department of the old Republic Iron & Steel Co. and later for 17 years was traffic manager of the Trumbull Steel Co., Warren, Ohio, now a Republic unit. Later he was district manager at Cleveland and Pittsburgh for Moore & McCormack, steamship agents. His next connection was as

assistant to the president of the American Short Line Railroad in Washington and during the past four years has been on the staff of the American Iron and Steel Institute in New York.

* * *

FREDERICK R. WARD has been appointed assistant district manager of the Chicago district of Republic Steel Corp., effective Sept. 1. J. L. HYLAND is the manager of that district. Mr. Ward's first position was as chemist for the Corrigan, McKinney Steel Co., Cleveland, which

COMPLETELY MODERN



CO. Springfield, Vermont, U. S. A.



D. B. CARSON

he left to become chief chemist of the American Manganese Co. In 1919 he became superintendent and mineralogist for the Tennessee Manganese Co. and in 1922 superintendent of operations for the Graham Furnace Corp. The following year he went with the Jones & Laughlin Steel Corp. as superintendent of the bar mills of its Pittsburgh works. He went with the Republic Steel Corp. in July last year as assistant superintendent of the finishing mills and special process division in the Chicago district, which position he held until his new appointment. He was born in DuBois, Pa., in 1891.

* * *

R. M. FENTON has been appointed chief engineer, Otis Steel Co., Cleveland, effective Sept. 1, succeeding C. C. WALES, who has resigned after holding this position for 12 years. Mr. Fenton formerly was chief engineer of the Newton Steel Co., now a unit of the Repub-

ONLY 4° WARMER AT ROOF
THAN AT BREATHING LEVEL

With the SENSATIONAL

AIRBLANKET

UNIT HEATER

BLANKETING STREAM

The AIRBLANKET Definitely REDUCES HEATING COSTS

...because only the AIRBLANKET brings below breathing level comfort with above breathing level economy. This amazing unit heater does not rely upon fins, louvers, deflectors or other ordinary devices to retain the heat in the working zone. An entirely different principle, using a high velocity of cool air to roll the stream of warm air down against the floor provides absolute control of the warm air.

TEN YEARS SUCCESS
During the past ten years many of America's "Hardest-to-Heat" buildings have been comfortably and economically warmed by this simple, proven method of heat distribution . . . the Exclusive AIRBLANKET Method.

Don't buy any unit heater until you have secured full details on the AIRBLANKET.

The AIRBLANKET is available for ceiling or floor mounting.



CORRECTLY ENGINEERED

UNIT HEATERS by AIRTHERM
Capitalizing thirty years research and experimentation Airtherm Engineers have produced the ultimate in unit heater efficiency and design. In addition to the AIRBLANKET, the Airtherm Line includes the Airvector (Fan Driven Units) and the Airheator (Blower Driven Units) . . . both of which embody many new, exclusive features in unit heater construction and performance.

Write for full details of the Airtherm line including the AIRBLANKET, at once.

AIRTHERM MFG. CO.

1488 S. VANDEVENTER ST. LOUIS, MO.

lic Steel Corp. and since leaving the Newton company has been a sales engineer of the Aetna-Standard Engineering Co., Youngstown.

* * *

FRANK F. SLICK, general superintendent, Carnegie-Illinois Steel Corp.'s Edgar Thomson works, Braddock, Pa., has been granted an extended leave of absence due to failing health.

His departure will break a continuous career of 42 years with the company, all of which time was spent at Edgar Thomson works, except for a four-year period from 1902 to 1906, when he was assistant engineer of ordnance in the city office at Pittsburgh.

He started as a clerk in the engineering department and became in turn a tracer, draftsman and roll designer. He was made superintendent of the No. 3 rail mill upon his return from the Pittsburgh office in 1906 and held that position until late in 1922 when he became operating superintendent.

Mr. Slick served as assistant general superintendent from Aug. 1, 1925, to April 30, 1933, when he was appointed acting general superintendent. He was given the position of general superintendent five months later and has held that post until the present time.

HARRY L. BRINDLE has been appointed acting general superintendent succeeding FRANK F. SLICK. Mr. Brindle has been with the company for 32 years, having started as a roll turner at the New Castle, Pa., steel works. He was employed in the roll shop as a machinist and assistant machine shop foreman from 1905 to 1919. He was then transferred to the Farrell, Pa., steel works as assistant master mechanic, and became in turn master mechanic, assistant general superintendent and general superintendent. Shortly after the consolidation

of the U. S. Steel Corp. subsidiaries into the Carnegie-Illinois Steel Corp., Mr. Brindle was appointed assistant general superintendent of the company's large operations in the Youngstown area and held that position until his current appointment.

He will be succeeded at Youngstown by **FRED B. LOVELAND**, who has been superintendent of the rolling mills of the Ohio works at Youngstown since 1933. Mr. Loveland began his career with U. S. Steel subsidiaries in 1906 as a clerk in the Greenville, Pa., plant of the National Tube Co. His other positions have been: bill clerk, Carnegie Steel Co., Greenville; assistant order clerk, Ohio works, Youngstown; order clerk, Ohio works; assistant superintendent and superintendent of the rolling mills at Ohio works.

* * *

GEORGE P. BURKS has been appointed chief chemist in connection with blast furnaces, open-hearth and rolling mills at Gary works of the Carnegie-Illinois Steel Corp. Mr. Burks is a graduate of Wabash College with an A.B. degree in chemistry and biology and has been connected with the company since 1921. He has served at Gary in various capacities and has been assistant chief chemist since 1922.

* * *

MAX H. SCHACHNER will be in contact with manufacturers and distributors as assistant sales manager of the Winton Engine Corp., division of General Motors, selling the new Winton two-cycle diesel engine. He is a graduate of Syracuse University, having obtained his M.E. degree there in 1927. He also spent a year at the California Institute of Technology. After a three-year apprentice engineer's course with the Continental Motors Corp., one year of which ran con-



F. F. SLICK



G. P. BURKS



M. H. SCHACHNER

currently with his work at Syracuse University, Mr. Schachner joined the industrial engine sales division of Continental. In January, 1934, he joined the Caterpillar Tractor Co., Peoria, Ill., in the diesel engine industrial sales division. In addition, he was editor of Caterpillar's Application Data Book for diesel engines. Mr. Schachner is a grandson of Whitecomb Judson, who was chief engineer of the McCormick-Deering Co. and, incidentally, was the inventor of the zipper. Two uncles, Arthur Tabin and R. W. Judson, founded Continental Motors Corp.

◆ ◆ ◆

C. E. JEREMIAS and E. A. SMITH have been appointed field engineers in charge of the newly-established Detroit office of the Mathews Conveyor Co., Ellwood City, Pa.

◆ ◆ ◆

WILLIAM H. SCHUSTER, who for the past year has been assistant welding instructor in the Lincoln Welding School at Cleveland, has been placed in charge of the new sales engineering office of the Lincoln Electric Co., at 400 North Street, Bluefield, W. Va.

◆ ◆ ◆

H. D. STALNAKER has resigned from the staff of the Continental Iron & Steel Co., to give all of his time to his own company, the Stalnaker Steel Co., 1030 Grant Building, Pittsburgh. The new company expects to do a general business in scrap iron and steel. H. D. Stalnaker is president and treasurer and his son, J. H. Stalnaker, is vice-president and secretary.

◆ ◆ ◆

WALTER P. LOTZ has been appointed sales manager of the standard tool division of William Sellers & Co., Inc., Philadelphia, to supplement the activities of EDWARD L. HOLLJES, sales manager, who will devote more of his time to the large industrial tools and railroad equipment.

◆ ◆ ◆

CHARLES C. TOMNEY, formerly tool designer of the Carrier Corp., Newark, N. J., has become affiliated as a sales engineer with the Vandyc-Churchill Co., New York.

◆ ◆ ◆

JOHN RYAN, for many years with the Texas Co., and WILLIAM ROSSER, formerly with the Symington Corp. and the Bradford Corp., have been appointed special sales representatives for the Iron & Steel Products, Inc., Chicago.

◆ ◆ ◆

ALFRED C. GOINS will succeed ARNO L. BILLETER as assistant superintendent of cold reduction at the Gary sheet and tin mills of the

GRAND RAPIDS SURFACE GRINDERS

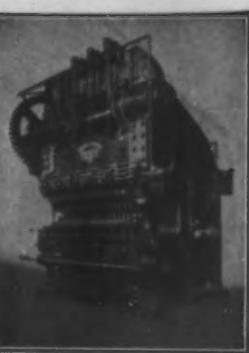


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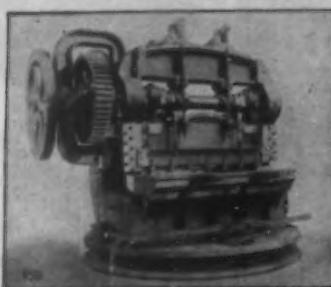


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Carnegie-Illinois Steel Corp. Mr. Billeter has been transferred to the new Irvin works of Carnegie-Illinois in Pittsburgh. Mr. Goins has been employed in the Gary sheet and tin mills since 1929, when he began as a tin mill electrician. He has served as turn foreman and temper rolling foreman in the sheet mills. Mr. Billeter has been at the Gary sheet and tin mills since 1919, and will have charge of the cold reduction department in Pittsburgh.

PETER J. NEBE succeeds J. B. RICHARDS as superintendent of annealing at the tin mill. He has been with Carnegie-Illinois since 1916, having previously worked for several other companies in the steel industry for a number of years.

JOHN E. SOYRING will succeed Mr. Nebe as night superintendent of annealing. He has been with the company since 1928 when he started in the Shenango works at Newcastle, Pa. He came to the Gary sheet and tin mills in 1933.

JOSEPH TAYLOR, who was previously employed as a clerk in the accounting department at the sheet and tin mills, began photography as a personal hobby and has now been named as plant photographer.

* * *

C. H. BOENIG, of Youngstown, N. Y., has been appointed sales



Effect the steady controlled stroke that your installation requires. Pipe one of these in the line from the operating valve to the cylinder, or if both the forward and reverse strokes are to be controlled, pipe one in the line to both ends of the cylinder. These valves are available in $\frac{1}{4}$ ", $\frac{3}{8}$ ", $\frac{1}{2}$ ", $\frac{3}{4}$ ", and 1" I.P.S.

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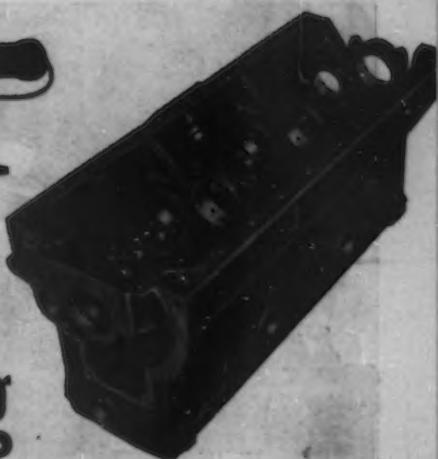
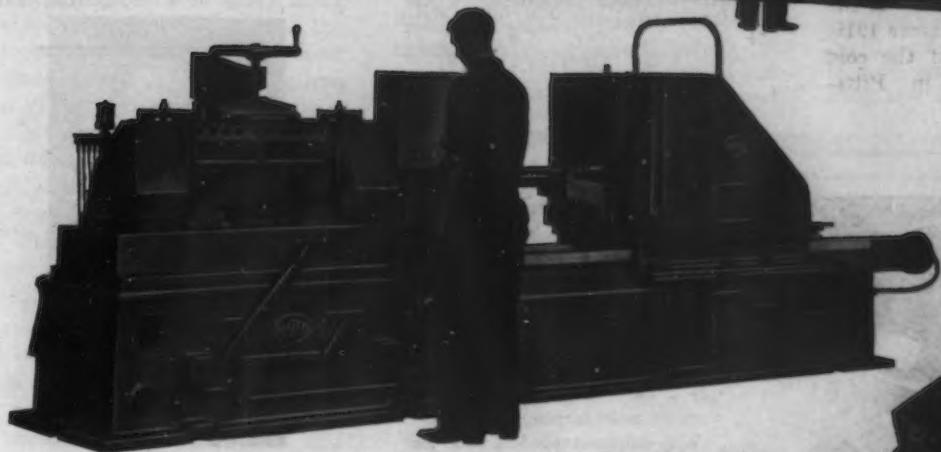
A. C. GOINS



A. L. BILLETER



P. J. NEBE



Core Drilling and Boring the Cam and Crankshaft Bearing Holes in 20 Cylinder Blocks Per Hour . .

Here is a good example of NATCO'S ability to furnish drilling and boring machines for low production requirements. It shows that even though production requirements are low (20 blocks per hour) the necessary operations may be performed efficiently and with a minimum of cost.

The two-way shown above is built of two NATCO HOLEUNITS and a low stationary type fixture arranged to hold one cylinder block. It is being used to core drill the cam and crankshaft bearings and also one expansion plug hole in one end of the block.

The other machine, a one-way built of one NATCO HOLESTEEL FLOOR TYPE UNIT and a stationary fixture is being used to semi-

finish align bore the cam and crankshaft bearing holes. One operator runs both machines and maintains a production of 20 cylinder blocks per hour.

These machines were built for a particular set of operations and may be considered specialized equipment . . . yet they are built standardized NATCO machine elements which are flexible and interchangeable. Both NATCO HOLEUNITS and NATCO HOLESTEEL FLOOR TYPE UNITS are built in a variety of sizes and capacities. Investigate them today. Call a NATCO representative and let him aid you in coming to a practical and profitable solution of your "hole" problems.

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Production Costs!
Investigate NATCO
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Drilling, Boring and Tanning Machines

engineer for the entire line of Harnischfeger products in the western section of New York, including the city of Buffalo with Rochester as the eastern boundary line, by the Harnischfeger Corp., Milwaukee.

* * *

J. M. J. KEOGH, assistant to the works manager, Allis-Chalmers Mfg. Co., Milwaukee, retired Aug. 31 on pension, at the completion of 56 years of service. He was born

in Milwaukee in 1866 and entered the offices of the old E. P. Allis Co., Milwaukee, in 1881 as a clerk, continuing with the successor firms, Allis-Chalmers Co., and the present Allis-Chalmers Mfg. Co., without interruption.

* * *

EMIL VILTER, president, Vilter Mfg. Co., Milwaukee, manufacturer of Corliss engines, refrigerating machinery, has been initiated as an honorary member of Pi Tau Sigma,

honorary mechanical engineering fraternity at the University of Wisconsin, from which he was graduated in 1894. Starting as a foundry apprentice in the Vilter works in 1895, Mr. Vilter worked



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THE MARVEL No. 8 is the truly universal metal cutting saw, handling all work from $\frac{1}{8}$ " x $\frac{1}{8}$ " to 18" x 18". It is one of the most versatile multi-purpose saws built.

With its planer-type bed, hand and power feed, and swinging saw carriage that will feed the blade into the work at any angle from 45° right to 45° left, it gets in on every job to save labor and costly hours or to improve shop practice. It will save "warehouse cutting extras" on die plates. It will save hours of machining in roughing to form and shape. It will miter, notch, and cut off large work rapidly, or will nip off the smallest rod cleanly—will handle the heaviest job or the most delicate cut with equal efficiency. You will see them everywhere, and wherever you see one, it's the busiest machine in the shop.

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round or 8" round or 5"
x 16" flat x 10" flat

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THREE RIVERS, MICH.



J. TAYLOR

in every department, including sales, and was elected president in 1920 upon the death of his elder brother, Theodore Vilter, founder of the firm.

Navy Bids on Steel Are Called For

WASHINGTON, Sept. 8.—The Bureau of Supplies and Accounts, Navy Department, will open bids on Sept. 21 for 603 tons of pearlitic manganese steel bars for delivery to the torpedo station at Newport, R. I. On Sept. 24 the bureau will open bids for 50 tons of rivet bar steel for the Cavite, P. I., Navy Yard.

Correction

LUDLUM STEEL CO., Watervliet, N. Y., claims the distinction of having been the first industrial company in the United States to use technicolor in an industrial educational moving picture. A recent news release by the United States Steel Corp., published in THE IRON AGE of Aug. 12, stated that the United States Steel Corp. is producing the first industrial moving picture in color. The Ludlum moving picture was produced early in 1936 and has been in circulation for about a year.

Graphitic Steel

(CONTINUED FROM PAGE 39)

rolls do not crack, chip or spall and no heat checking has been noticed. The Graph-mo rolls were machined to shape after having received the customary graphitizing treatment of normalizing and annealing and then given a heat treatment consisting of normalizing in air from 1600 deg. F., being held at heat for 1 hr. per in. of section. No drawing was done, and a hardness of 280 Brinell was developed on the working face.

Graphitic steel was first tested in the Timken plant, being tried out on a cage drawing die, the press operating at 90 strokes per minute. This operation is one of the most severe in the plant and is used for testing any new steel stock. However, the initial run with a Graph-sil die turned out over 200,000 pieces without showing a single scratch, where formerly the longest run that had been made was 10,000 pieces and then it was necessary to grind off 1/32 in. from the inner face of the die to remove scratches. The die shown on the left in Fig. 5 shows what happened to a former die after a run of 10,000 pieces, while the graphitic steel die on the right was free from scratches or scoring after turning out 309,000 pieces.

This success led to other applications and today practically every die used in cage manufacture at the Timken plant is made of graphitic steel. Both the water and oil hardening types of this new steel machine easily, records showing that machining time for die and punch manufacture is reduced from 30 to 50 per cent as compared to the steels formerly used. This free cutting quality applies to grinding operations as well as to lathe work.

Apparently the long life of graphitic steel dies and punches, as well as the smooth finish and high quality of pieces produced from these dies is due to the unique lubricating properties of the steel as well as to the fact that the dies and punches can be brought to the proper degree of hardness for the work at hand by simple heat treatments easily handled in any die shop.

Any graphite remaining in the

graphitic pockets exposed in finishing a die functions as a natural lubricant of the highest grade. Further, these pockets continue to function as microscopic lubricant retainers, with the result that a graphitic steel die is always well lubricated. This oil retaining quality can be demonstrated easily by spinning an oiled piece of graphitic

steel at high speed. Even after several minutes of spinning at 1800 r.p.m. a graphitic steel bar or die will feel greasy, whereas other steels will be perfectly dry.

This lubricated hardness is apparently responsible for the freedom from scoring, pick-up or galling, which is so noticeable in the case of some ordinary steel dies.

Plastallic

**FORMS ITSELF TO FIT
THE PACKING SPACE**

GARLOCK

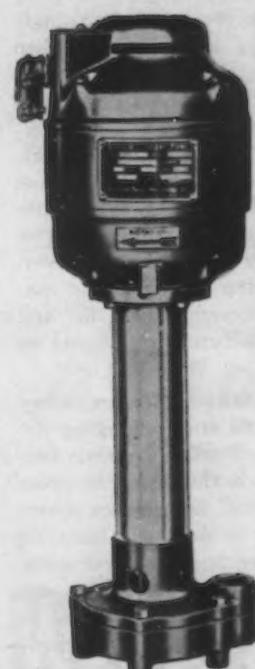
The purest asbestos fibre, soft metals, graphite and special lubricants are used in the manufacture of the comprehensive line of Garlock *Plastallic* Packings. *Plastallic* is easy to apply, forms itself to fit the packing space and, in service, combines into one homogeneous mass. When additional packing is required it is simply added to the *Plastallic* already in the stuffing box.



If you need a plastic packing you need Garlock *Plastallic*. Supplied in coil, ring and loose or bulk form for water, steam, air, gasoline, oils, etc., at various temperatures. Write for pamphlet.

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are outstanding because of the simplicity of their construction. Their ball-bearing driving motor with suspended rigid pump shaft—no packing glands nor metal contacts—the use of centrifugal force for pumping action—all tend to lessen friction and insure more dependable performance.

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Products formed of flat, round or half round wire.

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Electro-plating, chemical coloring, japaning, spray lacquering, enameling.

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Building of machinery for cigar box, brush, wood product and other manufacturers.

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The complete assembling of metal units under careful supervision for accuracy and workability.

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INCORPORATED
ALLENTOWN, PENNSYLVANIA

TABLE I
Physical Properties of Graphitic Steel

Type	Treatment	Yield Point, Sq. In.	Ultimate Strength, Lb. Per Sq. In.	Elongation in 2 In., Per Cent	Reduction of Area, Per Cent	Brinell Hardness
Graph-sil	Annealed	56,000	97,500	25.5	47.5	171
	Normalized from 1600 deg. F.	87,500	163,750	11.5	18.5	302
	Quenched from 1500 deg. F. into water and tempered at 900 deg. F.	158,000	194,000	8.5	18.0	401
	Quenched from 1500 deg. F. into water and tempered at 1100 deg. F.	120,500	142,500	15.5	29.6	286
	Annealed	49,500	84,500	25.0	40.1	197
	Quenched from 1475 deg. F. into oil and tempered at 900 deg. F.	177,000	218,000	8.5	14.0	388
Graph-mo	Quenched from 1475 deg. F. into oil and tempered at 1100 deg. F.	136,000	164,000	13.0	23.0	302

This in turn enables dies to be kept in service longer before polishing or re-grinding. Experience in the Timken plant has been that polishing is reduced over 50 per cent and that only about 20 per cent as much time is required for re-grinding dies since graphitic steel replaced the other types of die steel formerly used.

With increased die life comes decreased overhead, due to the reduction in the number of spare or replacement dies which must be kept in stock. Timken experience has been that the spare die stock for production dies can safely be reduced to 25 to 30 per cent of the number formerly carried on hand. In the case of small dies this may not seem to represent a heavy investment. In the case of a single size this may be true, but when that saving is multiplied by the whole range of dies required in a large plant it becomes an important item at the end of a year. A substantial reduction in the cost of die stock is attained, for graphitic steels are comparable in price with ordinary die steels. However, it is the saving in labor and machine time expended on die and punch manufacture that mounts up so rapidly.

Still another important economy has been found since changing die steels in the Timken bearing factory. That is in the saving in press production time. Experience shows that a press is down at least 45 min. on an average whenever a die or punch must be changed for any reason. If the shut-down is due to a change in the production schedule, there is no advantage in one steel over another. However, where schedules permit long runs, as is

customary in modern production practice, any shut-down due to die wear or failure is directly chargeable to the die. Consequently, when experience shows that a graphitic die lasts ten times as long in production as did a former die, a saving of approximately 8 hr. in production time is made. In other words, at least 40,000 more pieces can be produced on a press using a graphitic steel die than can be made on the same press in the same length of time when using a tool steel die.

Thus the savings made possible by graphitic steel in production work through reduced die manufacturing costs, reduced stock and overhead, reductions in set-up expense, and increased production due to the increase in available press operating time, are substantial. With these savings also comes the more intangible item of improvement in the finished product, and a decrease in the number spoiled or rejected pieces. In work where appearance is important this is essential, and where a uniform, smooth surface is structurally necessary, as is the case in bearing cages, this factor becomes vital.

Much work still remains to be done in the development and application of graphitic steel and research and experimental work in production operations is being continued. The indications are that a wide range of applications exist where these new steels may prove valuable, but it should not be thought that every problem in the die industry can be solved by using graphitic steel. Its value in the die field, however, is apparently well established.

China Must Go Abroad for Iron

(CONTINUED FROM PAGE 49)

iron over the period. I could not find out why coke consumption was so high, there seemed to be nothing in the composition of the raw materials used to cause it. W. H. Wong reports a 12 and a 33-ton furnace at Patung, but I know nothing about them except that they are now shut down.

A Sino-Japanese Enterprise

Of much current interest is the 250-ton furnace at Hsin-ching-shan, just west of Peiping. This was part of the government project to develop the high-silicia sedimentary iron ores of the Hsuan-lung district in northwestern Hopei, estimated by Tegren to contain over 90,000,000 tons. A \$5,000,000 (Chinese) company, called the Lung-yen, to be financed jointly by the government and private capital, was organized in 1918, and the blast furnace and a seven-mile branch line to connect with one of the deposits were finished. Nothing else was done and the furnace has never been lighted. Now the proposal is to re-open the project as a joint Sino-Japanese enterprise under the auspices of the "Economic Commission of the Hopei-Charhar Political Council," a Japanese-created body not recognized by the Nanking government. With the Chinese fighting the Japanese in Suiyuan, to the west of the ore region, and the memory of the confiscated joint enterprises in Manchuria so recent, one may doubt whether any Chinese money will go into the project. As the average silicia content is estimated at 16 per cent and cannot be reduced by washing, I have never been able to share the enthusiasm of some others for the project.

There are three projected plants: one of them well on toward completion. This is the steel plant subsidiary of the Northwest Company (which has some 20 others) in the suburbs of Tai-yuan-fu. This was designed by German engineers, and is being built and will be operated by foreign-educated Chinese. The plant consists of one 40-ton stack, to make foundry iron, and another of 100-120 tons capacity to provide the metal for the open hearths, of which there are to be

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FOR TWO WEEKS
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two of 30 tons capacity each. The rolling mill will only be equipped to roll railroad rails and 2-in. square bars, so as to keep down the investment. For a time it can probably keep busy on rails, as extensions of existing lines are planned. A modern coking plant, with ammonia and benzol scrubbers, is already nearly finished and the blast furnaces are more than half done. All the common and fire-bricks were made locally, as were many of the castings at a nearby arsenal, but the structural

and sheet steel, cranes, etc., were bought in Germany.

They expect to get their coke from the Wu-tai district, 80 miles north, which they said yields a good hard coke; there is also coking coal available at Hsien-kan. They are building a railway to Hsi-shan, 27 miles west, to an ore deposit there and they also expect to get some ore from Yang-chuan. There is also ore available at Ting-hsiang, 60 miles north and at Niang-wu, 100 miles north. The water supply is now rather short,

but they are drilling wells and should get water from the structure that exists in the valley. The enterprise impressed me as well planned and constructed, the staff competent, and it should have a fair chance of succeeding. The estimated cost was 6,000,000 Chinese dollars (about \$2,000,000 gold) but it will probably run over that and sufficient funds seem to be available for its completion.

Projected Steel Plant Near Canton

Another enterprise, still in the project stage, is to build a steel plant on deep water just west of Canton. This is based on a 10,000,000-ton limonite deposit about 125 miles up the West River, only a short distance from water transportation, that has been thoroughly test-pitted by the provincial geological survey, so there is adequate knowledge of the quantity and quality available. The iron content in the published analyses ranges from 45 to 58 per cent and the S. and P. are low. About 100 miles east of Canton there is also available about a million tons of magnetite, but as a fairly long railroad to water transportation will be necessary they will probably not use it at first. Coke is more of a problem. A small deposit of strongly coking coal can be reached by a 14-mile branch from the Canton-Hankow railway, just south of where it crosses the provincial boundary into Hunan. Unfortunately it is high in sulphur that is organic and so cannot be reduced by washing. The present idea is to mix it with a lower-sulphur slightly-coking, semi-anthracite already being mined in considerable amount a little nearer Canton, in the hope that a satisfactory product will result.

The contract for the design and erection of the plants is held by the British subsidiary of H. A. Brassert & Co. Present plans call for a 275-ton blast furnace and, according to one of the engineers assigned to the project in the office of the Reconstruction Commission, a small converter to blow the metal up to a product that will serve to take the place of scrap in the open-hearths, there being no local supply of scrap. The financing of the plant is still somewhat nebulous; it was hoped to secure a grant of 10,000,000 Chinese dollars from the National government, but only half that amount has been allotted and the provincial authorities are expected to provide the remainder.

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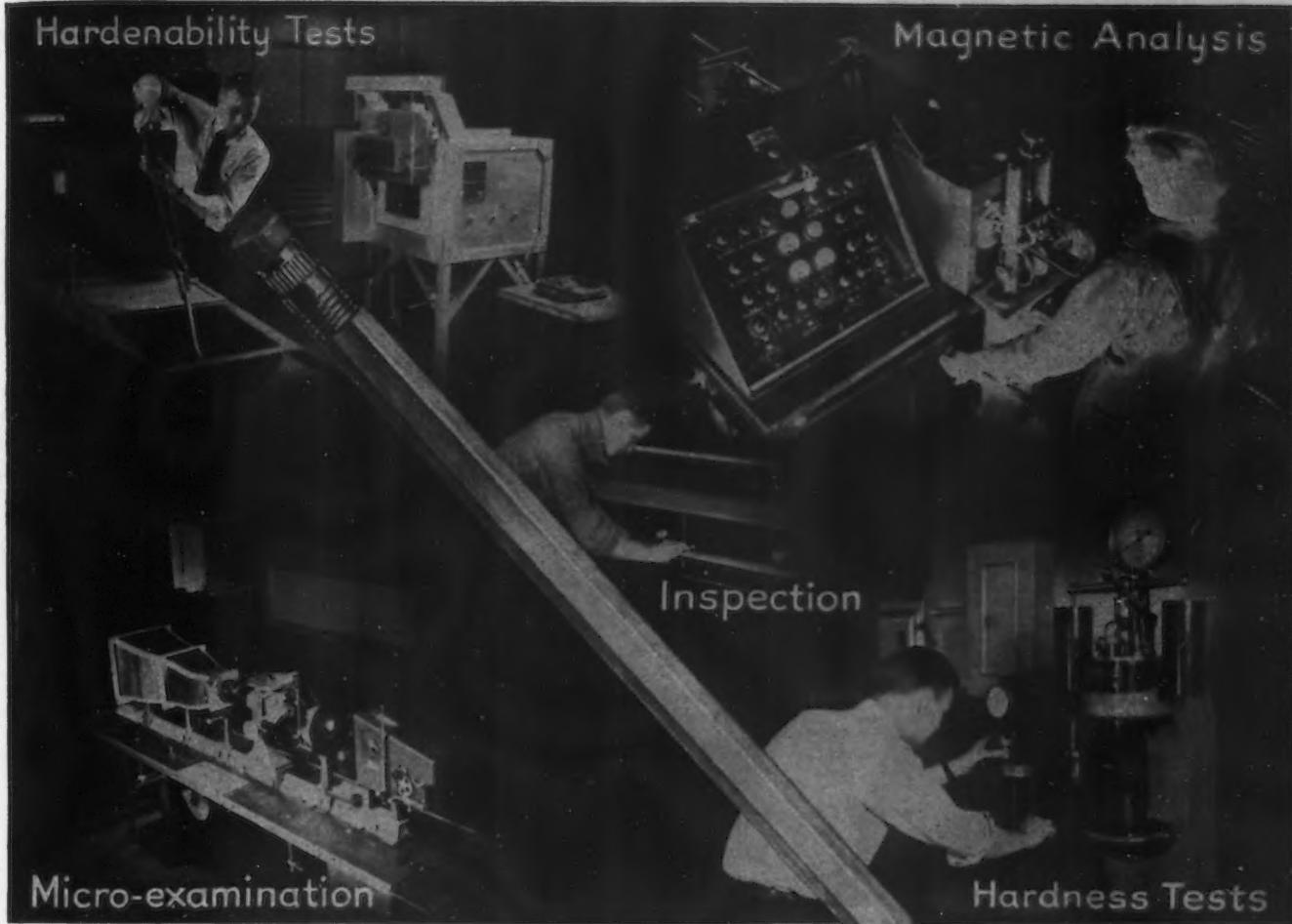
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The *quality* Cold Drawn Steel produced in B & L mills is often the solution to rising costs. Its accuracy, uniformity and machining character have cured many a "production headache" for machine builders, automotive manufacturers, farm implement makers, and steel users generally.

In B & L mills, the latest scientific apparatus is employed for controlling steel quality. Laboratory inspection methods are combined with practical production methods to bring out the best in the bar. Science joins with experience in developing fine grades of bar steels, shafting, screw stock and alloy steels.

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The idea seems to be that profits accruing out of various provincial enterprises can be applied to credits (presumably British) for the plant construction. It is interesting to notice that the newly-appointed manager of the nearby cement plant has announced he will start an extensive program of plant betterment, and one recalls that some railroads that were financed with loans, to be repaid out of operating profits, were a long time getting out of the red, as all surplus operating revenues were used for extensions and im-

provements. The intention is to make only billets, bars, and structural shapes, and structural steel, for which there is said to be a large local market. It would seem that the real test of the success of the project will come not in its technical operation, but in ability to sell its products at a profit.

National Plant

The project for the National government to build a steel plant (in spite of the unhappy record of the Han-Yeh-Ping enterprise) is still in tentative form. I could

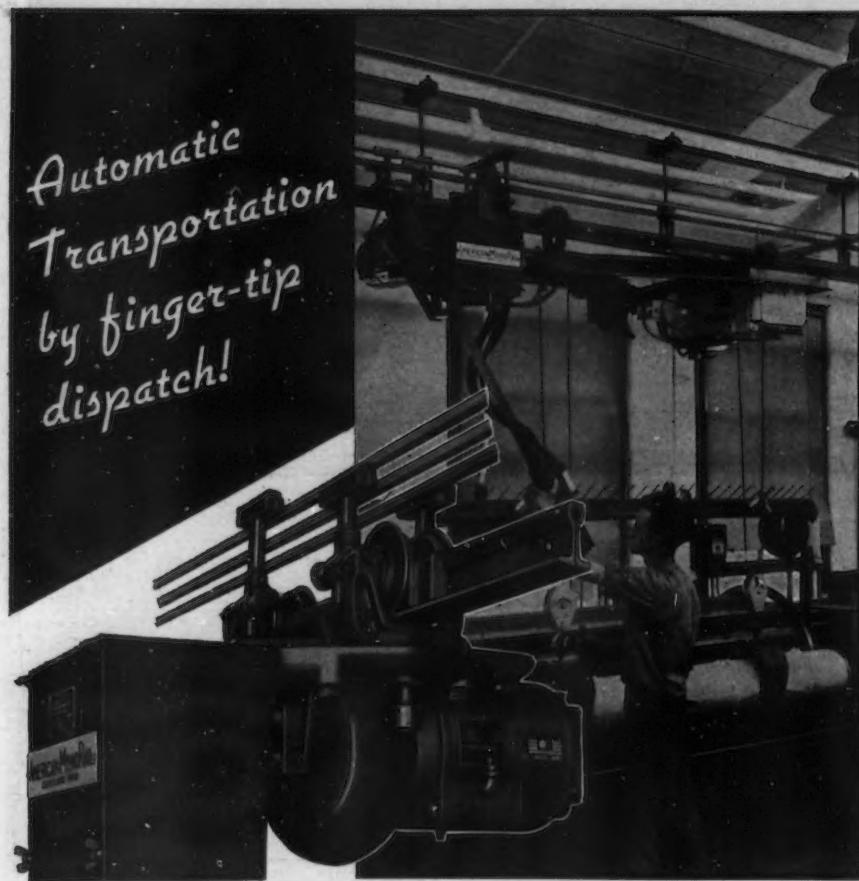
learn no details about it beyond that it has been decided that it shall be located in Hunan, probably somewhere near Changsha. The determining consideration was likely that there it will be less accessible to the gunboats of possibly hostile powers, as the Central government objected to the deep water site of the proposed Canton plant as being too vulnerable to foreign attack. At Changsha it would also be convenient to the P'ing-hsiang coke that the Hanyang plant used to use. And the Canton-Hankow railroad would relieve it of the problem that used to be imposed by the shallow water of the Hsiang river. I have not heard whether it is expected to provide the rails for the various railroad extensions between there and the coast, and to the west into Kweichow. Unless construction of the plant is expedited these railroads may be finished before the steel plant. As far as marketing problems are concerned a steel plant at Changsha would seem to have all those of Hanyang plus a few of its own. But as a strategic necessity the authorities evidently consider it worth while.

British Imports of Scrap Still Rising

LONDON (Special Correspondence).—The United Kingdom's imports of scrap iron rose to 161,000 tons in July, according to official figures just issued. This compares with 121,000 tons in June and 77,000 tons in May. In July last year only 70,000 tons were imported.

The most interesting fact about the British scrap iron situation is that prices up to £5 (\$25) per ton are being paid for American scrap as compared with a maximum price of one-half that sum for domestic scrap.

Recent shipments of scrap from the United States have not been very high grade. The chief source of supply appears to be the old car dumps. As a result, the suspicion has arisen that prices in Britain are being forced down to an unreasonably low level. The British Iron and Steel Federation is against any general increase in domestic scrap prices, but it is felt that any curtailment of American exports would bring about this result. It is realized that restriction of American exports is a possibility and, in the event of legislation being enacted to limit such shipments, the price which British scrap merchants would be prepared to pay for local supplies would rise substantially.



Loads as heavy as three tons are now dispatched for automatic transportation over monorail systems by means of the American Mono-Tractor.

This rubber wheel drive unit successfully propels hoists, carriers and cranes at speeds up to 300 feet per minute.

It operates through track switches, up 10% grades, over scale or lift

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For a complete labor saving system, the American MonoTractor is indispensable. Engineering service furnished without cost. Complete information will be sent on request.

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Court Refuses Stay in Ambridge Election Ordered by NLRB

WASHINGTON, Sept. 7.—With the National Electrical Products Corp., Ambridge, Pa., placed between the upper and the nether millstones, the AFL and CIO are clawing at each other over Court-demanded recognition by the company of the Brotherhood of Electrical Workers, an AFL affiliate, as the sole bargaining agency. Although the National Labor Relations Board flouted the order of Judge F. P. Schoonmaker of the United States Court for the western district of Pennsylvania, the company won a review of the local court order from Judge John Biggs, Jr., of the United States Circuit Court of appeals at Wilmington, Del., on Sept. 4. Judge Biggs refused, however, to stay the election ordered by the NLRB. At the dictation of the CIO, the board ordered the company to hold an election in an effort to force recognition by the company of the CIO United Electrical and Radio Workers of America.

In the face of the Appeals Court decision, A. R. Johnson, business agent of the AFL local at Ambridge, announced that the union would "submit involuntarily" to the NLRB's order for a collective bargaining election at National Electrical Products. "Our union is being forced into a vote by the labor board," said Mr. Johnson, "despite a ruling by the Federal Court that our contract with the corporation is valid."

Meanwhile the AFL, lashed into a fury, has turned a sharp attack on the NLRB and has urged Senator Wagner, author of the trouble-making National Labor Relations Act, to make good on his assurance to AFL unions that the act would not be used as an instrument to defeat legitimate labor unions. For the Senator, the chickens have come home to roost since he was urged to take issue with the board for which he is primarily responsible and support the AFL in its protest against the board's high-handed decision in the National Electrical Products case.

The board, in flying in the face of the original Court order, of course, apes the CIO, and flared forth with the charge that the company violated the Wagner Act by encouraging membership in the AFL union by interference and coercion, and alleging that doubt

remains as to the numerical strength of the two unions. This despite the court decree requiring the company to perform its contract with the AFL union made on May 27 after the plant was strike-bound with resulting heavy loss of production and wages.

Several tests exist in the case.

Is the CIO or its alter ego, the NLRB, bigger than the court? Are courts, representing organized society, to be flouted with impunity by a self-seeking private labor dues organization, with support of a Government body, merely in order that it may build up its own economic and political power through the closed shop, the immediate outstanding CIO objective?

Is the one-sided Wagner Act to be pushed by intimidation and

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The three patterns are here shown half-size.

"A.W." Rolled Steel Floor Plate can be cut to any required shape. Installation is permanent — and is made quickly, without disturbing men or production.

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coercion not only over industry but also over all labor organizations save the CIO?

Answer to the last question has been definitely put up to Senator Wagner.

And are quarrels between rival labor organizations, ambitious for power, going to be permitted to continue paralyzing industry and employment and generally hold back recovery?

Steel Employment

At Peak in July

EMPLOYMENT in the steel industry during July recovered completely from the effects of the strikes in June and increased to 594,000, according to figures released by the American Iron and Steel Institute. The July figure was only one-fourth of 1 per cent

below the record total of 595,000 employees in May, despite the fact that operations in the industry during July were nearly 12 per cent under May.

Total payrolls of the industry in July amounted to \$90,550,000, about 2.5 per cent below May, reflecting the lower rate of operations.

The number employed by the industry in July was 7 per cent above the average of 556,000 employed in the industry during June. July payrolls likewise showed a marked increase over the total of \$87,520,000 paid out in June.

Of the total number of steel employees during July, wage-earning employees numbered 533,000, as compared with 495,000 in June and 533,500 in the record month of May.

Average hourly earnings of wage-earners amounted to 86.8c. per hr. in July, as against 86.6c. in May. In June, wage-earning employees received an average of 87.7c. per hr., the somewhat higher figure being due to emergency conditions in plants affected by the strikes.

An average of 37.3 hr. per week was worked by wage-earning employees in July, which compares with 39.2 hr. per week in June and 38.6 in May.

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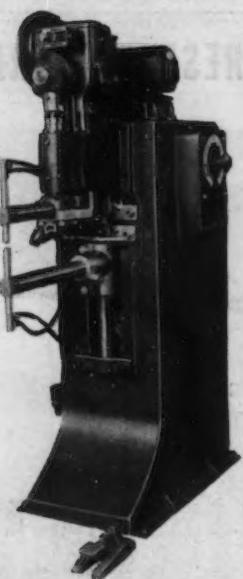
All working parts are enclosed in an oil tight housing.

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Motor required 1/2 HP., 1800 RPM.

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Steel & Wire To Build Big Tramway

AMERICAN Steel & Wire Co. will construct for the State of New Hampshire a 5200-ft. aerial tramway at Franconia in the White Mountains extending from Franconia Notch near Echo Lake up the side of Cannon Mountain to near its peak. The tramway will be the first of its type in North America, although similar ones have been used in the mountain regions of Europe for a number of years. The tramway will enable visitors to the White Mountains to reach the peak of the mountain without being obliged to make a mile-long journey afoot up a steep grade. Cost of the project is around \$250,000, of which \$191,975 is for the construction of the tramway, while an additional amount of approximately \$55,000 will be used to provide ground for the landing platform and other expenses.

Two cables and two trams are to be provided, the trams having a capacity of 25 passengers per trip. It is estimated that the tramway will operate at a speed of approximately 10 miles per hr. and a one-way trip will take about six minutes.

Youngstown Sheet & Tube to Spend \$20,000,000 on Plant Expansion

YOUNGSTOWN SHEET & TUBE CO. contemplates the expenditure of approximately \$20,000,000 for plant expansion, particularly at its Indiana Harbor works, to provide additional ingot and finishing capacity and to replace certain units which, as stated, will result in a material saving in cost and improved quality of products.

Announcement of these proposed extensions is made in a letter to shareholders notifying them of the special meeting of shareholders to be held Oct. 19 to consider new financing plans. It is expected that \$30,000,000 in additional capital funds will be provided by the financing.

The contemplated improvements are in addition to those authorized during 1937 involving expenditures of \$13,500,000, most of which are in the Youngstown district.

Most Companies Now Training Workers

A RECENT survey by the National Industrial Conference Board indicates that four out of every five companies have adopted some form of training for industrial work in order to meet present and future needs for skilled workers.

The results of the Conference Board's survey, which covered 473 companies in various industries and in different sections of the country, are presented in a report, "Training for Industry." This report shows that training on the job is the method generally used. Only 8.5 per cent of the companies surveyed are maintaining so-called vestibule schools, which represent a type of training in the plant under special instructors and the assignment of separate machines for that purpose. Systematic apprentice-training is reported by 272 companies, chiefly in the metal working industries.

The time required for training ranges from one week to more than five years. In those companies having apprentice-training courses, the training period is generally four years.

The compensation of persons in training is shown to be at least 50 per cent of the regular rate in

over 90 per cent of the companies surveyed, and amounts to 80 per cent of the regular rate in about

32 per cent of the companies.

Training is given to mature persons and regular employees as well as to youths and beginners. In most companies training is not given to persons under eighteen years of age. Women as well as men are offered training opportunities in a number of companies.



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SOCKET WRENCHES



Standardize on ARMSTRONG Socket Wrenches. (1st) For finer tools—chrome Vanadium Steel chrome plated. (2nd) for uniformity and interchangeability — ARMSTRONG SOCKETS are made in all sizes in all standard types. (3rd) for improved drop forged ratchets, and (4th) for the Drivelock Feature.

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"The Tool Holder People"

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NEW YORK SAN FRANCISCO LONDON

NLRB Denies Bethlehem's Request For Delay in Hearings

WASHINGTON, Sept. 7.—The National Labor Relations Board today denied the Bethlehem Steel Co.'s request for a delay in the scheduled hearings on alleged violation of the Wagner Act. A Labor Board spokesman told THE IRON AGE that the request was disposed of in the

customary manner and that the action would not put the company at any disadvantage when the hearing opens on Wednesday.

Bethlehem had asked for several weeks' delay and said the board's action "unreasonably required appearance Sept. 8 with a quantity of data that would re-

quire weeks of preparation." The company flatly denied all allegations made against it and charged the Board had made "vague and indefinite" statements in the complaint.

Bethlehem's total reply was in the form of four documents filed at the NLRB offices in Washington, Sept. 4, in response to the board's complaint alleging unfair labor practices and notice of a hearing to be held at Franklin Borough, Pa., on Sept. 8. Such documents were served only five days after the service of the complaint, which the Labor Board stated had been prepared after many weeks of investigation by it. The documents were:

1. Motion by Bethlehem Steel Corp. that complaint against it be dismissed, as it is a holding company, and is in no way engaged in production or manufacture.

2. Denial of all allegations of unfair labor practices by Bethlehem Steel Co.

3. Motion for bill of particulars and extension of date of hearing by Bethlehem Steel Co., in order that the company may know what the charges really are and have time to prepare its defense to them.

4. Affidavit on behalf of Bethlehem Steel Co., protesting the action of the National Labor Relations Board in making many charges of unfair labor practices without naming persons or specific instances, in calling a hearing on short notice over the Labor Day week-end, and in subpoenaing voluminous records and an extensive amount of information about the company's business which would take weeks of preparation.

While the company has been summoned to a hearing on Sept. 8, the first notice which it had of the hearing was not received until Aug. 30, though the board sent notice to certain employee representatives with letters dated Aug. 20.

A further complaint by the company is against the board's practice in this case of alleging intimidation and other unfair practices without any data of the instances complained of. In the Weirton and Republic cases, specific instances were cited by the board in its complaint, but in only one instance (Mayor Shields of Johnstown and James M. Mark, SWOC organizer) is there any mention of particulars in the complaint against Bethlehem.

Included in the complaint served on the company are charges originally filed by the Steel Workers Organizing Committee of alleged

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company domination of the plan of employees' representation, and supplementary charges that the company during a strike begun June 11 used spies, interfered with peaceful picketing, intimidated employees by the maintenance of an arsenal, and acted in collusion with Mayor Daniel Shields of Johnstown.

It is also charged that the company threatened to and did discharge, demote and otherwise discriminate against union workers. The complaint included a petition requesting determination by the board of the 55,000 Bethlehem employees' choice of a collective bargaining agency.

As filed with the board, the petition proposes that all the employees act as a unit in choosing or rejecting SWOC as their bargaining agent with the company.

The hearing will be conducted by Frank Bloom, trial examiner.

American Gas Ass'n Will Meet Sept. 27

THE American Gas Association has announced that it will hold its annual convention in Cleveland, Sept. 27 to Oct. 1. Among the many papers prepared for the meeting are a number relating to the use of gas in the metal industry, as "Advanced Applications of Gas to Forging" by A. Steever, Columbia Tool Steel Co., Chicago; "What Industrial Gas Men Should Know About Steel" by R. G. Guthrie, chairman of the ferrous metals division, and "Modern Methods of Applying Gas to Large Power Boilers" by L. S. Reagan, vice-president, Webster Engineering Co., Tulsa, Okla.

Complete details of the program may be secured from A. Forward, 420 Lexington Avenue, New York, managing director of the association.

Safety Congress Will Be Held Oct. 11-15

THE 26th National Safety Congress and Exposition will take place in Kansas City, Oct. 11-15. Sessions covering every phase of safety work will be held in the new municipal auditorium.

Prominent safety leaders who will participate in the program include P. G. Hoffman, president, Studebaker Corp., Governor L. C. Stark of Missouri, Governor Harold G. Hoffman of New Jersey and W. H. Cameron, managing director of the National Safety Council.

Weirton Employees' League Charges NLRB Bias for CIO

NEW CUMBERLAND, W. VA., Sept. 7.—In protesting the questioning by Labor Board attorneys of an employee representative regarding finances of the Employees' Security League at the Weirton Steel Co., William T. Fahey, counsel for the Weirton Steel employees, charged the board

with one-sided handling of the hearing.

"We object," he said, "to this crucifying of our organizations by the board when they refuse and are not required first to produce similar information about the CIO and the SWOC."

"On several occasions we have

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VARIABLE SPEED TRANSMISSION. Provides infinite speed adjustability over wide range. Accurate and positive at all speeds. Modern, compact open and enclosed designs, vertical and horizontal. Fifteen sizes—fractional to 100 h. p. Speed variations from 2:1 to 16:1 inclusive.

VARI-SPEED MOTOR PULLEY. Simplified development of transmission. Mounts on standard shaft of any constant speed motor. Forms direct drive to machine. Sliding motor base is moved forward or back for speed changes. Seven sizes—fractional to 7½ h. p.; 3:1 range of variation.

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Outstanding advantages of REEVES units:

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asked questions concerning the organization of the CIO and the SWOC. It seems to me the proper procedure before going into who the Security League may be or what the employees' representation plan may be, that it would be fitting if the CIO and the SWOC would come in and show what they are and who they are and why they are."

John W. Porter, chief Labor Board counsel, replied that the existence and the nature of the

Labor Board was not at issue in the hearing, adding:

"It is the responsibility of counsel for the board to present this case in the manner that seems to them most fitting."

E. G. Smith, trial examiner, presiding at the start of the fourth week of testimony on the board's complaint that the company interfered with its workers' joining the CIO, interjected:

"Expunge Mr. Fahey's remarks from the record. If you have any

objections to make, make them in the proper manner. Overruled."

Clyde A. Armstrong, chief company counsel, asked that the board's attorneys state whether they intended to bring in records of the CIO membership. Mr. Smith said:

"We're not up to that yet."

Calder A. Lyons, an employee representative, testified that Ernest T. Weir, chairman of the National Steel Corp., of which Weirton is the largest unit, had told employee representatives at a meeting:

"As long as I live I intend to see to it that Weirton Steel Co. employees get as much pay as is paid anywhere in the steel industry."

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will cut your coal handling costs! Use of standard Bartlett-Snow coal handling equipment layouts—which can be altered to meet exactly the yard and track requirements of 90% of boiler plants rated 5000 H. P. and less—enable engineers and plant executives to minimize the charges for new engineering. They permit the maximum amount of the appropriation to be expended for actual plant facilities . . . combine maximum dependability with low operating and low maintenance charges. Complete details and a fully descriptive catalog will be sent on request. Send for a copy.

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... Steel and pig iron business is dragging.

ST. LOUIS, Sept. 8.—Business in finished steel is lagging. Warehouse business in August was approximately 15 per cent below that of July. Structural fabricating plants are operating at an average of about 50 per cent of capacity, with two plants at 70 per cent. St. Louis Ship Building Co. is low bidder on 15 pontoons, requiring 500 tons of structural plates, for the United States Engineers at Memphis, Tenn.

With a tapering off in business reported by melters of pig iron has come a consequent decline in shipments and orders. The open-hearth furnaces in the St. Louis area are down to 65 per cent of capacity. Business with the jobbing foundries also is off. Stove plants have heavy bookings, but the heat has been holding down their production.

McKay Co. to Make Electrodes

THE McKay Co., Pittsburgh, manufacturers of tire chains, industrial chains and metal furniture, has announced the establishment of a new division for producing shielded-arc welding electrodes. A wide range of types and sizes will be made at the company's new plant at York, Pa.

L. E. Faulkner has been appointed chief chemist of the electrode section and M. J. Dresner will be in charge of sales and service of the new product.



FABRICATED STEEL

NORTH ATLANTIC STATES

South Boston. 250 tons, Westinghouse Electric & Mfg. Co. service building, to New England Structural Co., Everett, Mass.

Boston. 100 tons, Huntington Avenue subway, to Carnegie-Illinois Steel Corp.

Lowell, Mass. 190 tons, New England Telephone exchange, to New England Structural Co.

New York. 7500 tons, West Side elevated highway, to Harris Structural Steel Co., Plainfield, N. J.

New York. 400 tons, store at 124th Street and Eighth Avenue, to Bethlehem Steel Co.

New York. 135 tons, oil refinery equipment for Universal Oil Products Co., to Belmont Iron Works, Philadelphia.

New York. 300 tons, alterations to stockyard building, New York Central Railroad, to American Bridge Co.

Montour Falls, N. Y. 530 tons, Pennsylvania Railroad bridge over Catherine Creek and viaduct at Alger Street, to Bethlehem Steel Co.

Woodbridge, N. J. 220 tons, highway bridges, to Bethlehem Steel Co.

Elizabeth, N. J. 230 tons, grade crossing elimination, Central Railroad of New Jersey, to Bethlehem Steel Co.

Carneys Point, N. J. 180 tons, buildings for E. I. duPont de Nemours & Co., to Belmont Iron Works.

Duquesne, Pa. 260 tons, building for Linde Air Products Co., to Fort Pitt Bridge Works Co., Pittsburgh; Austin Co., Cleveland, general contractor.

Baltimore. 355 tons, addition, Carr-Lowery Glass factory, to Maryland Steel Products Co., Baltimore.

SOUTH AND SOUTHWEST

Charleston, W. Va. 240 tons, Michael Cohen apartment building, to Trojan Steel Co., Charleston.

Franklin, Va. 120 tons, conveyor supports, Chesapeake-Camp Corp., to Richmond Structural Steel Co., Richmond, Va.

Memphis, Tenn. 1600 tons, warehouse for Firestone Tire & Rubber Co., to Carnegie-Illinois Steel Corp.

Wilcox and Marengo Counties, Ala. 115 tons, bridge, to Virginia Bridge Co., Roanoke, Va.

Baton Rouge, Miss. 11,100 tons, Mississippi River bridge, to Ingalls Iron Works Co., Birmingham.

Pyatt, Ark. 165 tons, Missouri Pacific beam spans, to Stapp Brothers Bridge & Iron Co., St. Louis.

Muskogee, Okla. 300 tons, post office, to J. B. Klein Iron & Foundry Co., Oklahoma City.

Sierra County, N. M. 165 tons, bridge, to Darbyshire-Harvie Iron & Machine Co., El Paso, Tex.

De Baca County, N. M. 105 tons, bridge, to Midwest Steel & Iron Works Co., Denver.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

South Boston. 2200 tons, Edison Co. plant.

Johnson, Vt. 105 tons, State bridge.

Kittery, Me. 100 tons, State bridge.

New York. 18,000 tons, main span, Bronx-Whitestone bridge.

New York. 300 tons, additions to public school No. 26 in Bronx; Harris Structural Steel Co., Plainfield, N. J., low bidder.

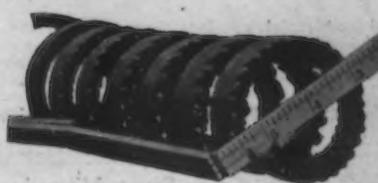
Brooklyn. 750 tons, school No. 252.

Queens, N. Y. 1100 tons; 750 tons for public school No. 160, 350 tons for alterations to public school No. 142.

CENTRAL STATES

Canton, Ohio. 800 tons, extension to open-hearth and soaking pit buildings and stockroom for Timken Steel & Tube Co., to American Bridge Co.

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Jessop meets the exacting demands of industry for quality high speed tool steel with seven types of material.

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Queens, 3000 tons, temporary trestle over Rikers Island Channel.

Queens, 900 tons, garage for city of New York.

Elmhurst, N. Y., 230 tons, recreation center.

SOUTH AND SOUTHWEST

Mobile, Ala., 350 tons, buildings, Aluminum Co. of America.

Dallas, Tex., 898 tons, bridge.

Galveston, Tex., 454 tons, bridge.

State of Oklahoma, 430 tons, highway bridges; Mayes County, 330 tons; Dewey County, 100 tons.

CENTRAL STATES

Adams County, Ohio, 220 tons, Brush Creek State highway bridge.

Hocking County, Ohio, 120 tons, State highway bridge.

Trumbull County, Ohio, 120 tons, State highway bridge.

Cleveland, 500 tons, addition for Brewing Corp. of America.

Erie, Mich., 340 tons, grade separation.

Chicago, 450 tons, Glidden Varnish Co. building; bids Sept. 11.

Kansas City, Mo., 4000 tons, court house; Swenson Construction Co., Kansas City, low bidder on general contract.

WESTERN STATES

Bonneville, Ore., 182 tons, switching and bus structure on roof of a power house; bids Sept. 24.

FABRICATED PLATES

AWARDS

Flint, Mich., 255 tons, floor over press pits, Fisher Body Corp., to R. C. Mahon Co., Detroit.

Batesville, Miss., 670 tons, pipe and pipe fittings for U. S. Engineers, Vickburg, to Nashville Bridge Co., Nashville, Tenn.

NEW PROJECTS

Memphis, Tenn., 500 tons, 15 pontoons for United States Engineers; St. Louis Ship Building Co., St. Louis, Mo., low bidders.

Wheeling, W. Va., 650 tons, coal bin, Wheeling Steel Corp.

SHEET PILING

AWARDS

Ithaca, N. Y., 105 tons, retaining wall at Cayuga Inlet, to Bethlehem Steel Co.



... Awards of 3200 tons
—3350 tons in new
projects.

AWARDS

Brooklyn, 240 tons, Avenue N sewer, to Capitol Steel Corp., Brooklyn.

Fulton, N. Y., 250 tons, bar mats for State road, to Bethlehem Steel Co.

Buffalo, 111 tons, Scajaquada Creek reinforcement, to Joseph T. Ryerson & Son, Inc., Chicago.

Buffalo, 250 tons, flour storage, Washburn-Crosby Co., to Buffalo Steel Co.

Buffalo, 150 tons, sewer and service conduits, PWA project 1034-R, to Bethlehem Steel Co.

State College, Pa., 500 tons, girls dormitory, Pennsylvania State College, to Bethlehem Steel Co.

Detroit, 280 tons, building, Dodge Brothers, to Bethlehem Steel Co.

Michigan City, Ind., 100 tons, State prison, divided between Hugh J. Baker and Joseph T. Ryerson & Son, Inc.

Indianapolis, 150 tons, International Harvester building, divided between Hugh J. Baker and LaClede Steel Co.

Greenup County, Ky., 530 tons, highway underpass, to Pollak Steel Co., Cincinnati.

Milwaukee, 360 tons, malt house, Kurth Malting Co., to Joseph T. Ryerson & Son, Inc.

Manitowoc, Wis., 260 tons, Wisconsin Malting Co., to LaClede Steel Co.

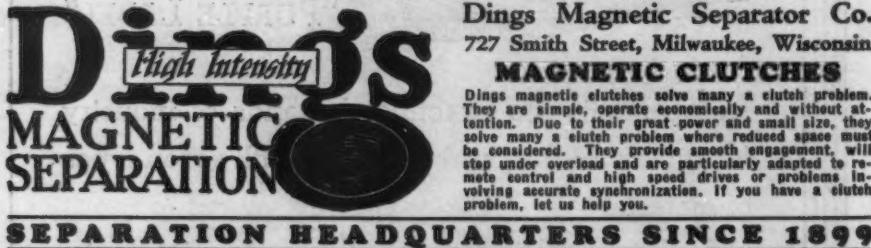
NEW REINFORCING BAR PROJECTS

New York, 400 tons, main span, Bronx-Whitestone bridge.



Hot Separators Won't Separate!

This is important to anyone considering the purchase of a magnetic separator. Separators are not all the same and Dings engineers have gone farther in developing features for cool separator operation than any other manufacturer. Magnetic Pull is the result of current—the more current consumed the more pull, and the better the separation. Dings design includes larger longitudinal and radial openings than on other separators, but more than this. It includes vanes on the sides of radial openings between pulley sections that assure twice the heat radiating surface of any other make of pulley, size for size. This makes possible the use of more current without heating up—and, of course, better separation. Don't buy a separator without investigation—come to Separator Headquarters and you will be reliably advised without any obligation on your part.



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The steels we supply will improve your production in accordance with our prediction.

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1887 — FIFTY YEARS OF FRIENDLY SERVICE — 1937

Scotch Plains, N. J., 250 tons, highway project; bids close Sept. 14.

Washington, 800 tons, Mellon Art Gallery.

Paducah, Ky., 197 tons, post office; Algernon Boyer, Louisville, general contractor.

Franklin County, Ohio, 200 tons, tuberculosis hospital.

Chicago, 100 tons, sanitary district, Division H-H.

Evanston, Ill., 150 tons, post office; bids Sept. 17.

Peoria, Ill., 120 tons, dam across Illinois River; bids Sept. 13.

Milwaukee, 400 tons, Pabst elevator.

Minneapolis, 225 tons, social science building, University of Minnesota.

Hastings, Neb., 200 tons, Chicago, Burlington & Quincy coaling station.

Kansas City, Mo., 538 tons, Federal court house; Swenson Construction Co., Kansas City, low bidder on general contract.

Petaluma, Cal., 344 tons, feed mills and warehouse; general contract to Jones & Huddlesfeather.

San Francisco, 162 tons, Traung Printing Co. plant; bids soon.

Sausalito, Cal., 139 tons, reconstruction of two highway bridges; bids Sept. 26.



...Imports from Great Britain practically nil; some from U. S.

TORONTO, Sept. 7.—With imports of steel from Great Britain practically nil, Canadian producers are not meeting the same competition for business as in former years and, in addition to obtaining a greater part of the domestic demand, are favored with heavier buying from European countries and the British dominions. Steel imports from the United States have increased, but the greater part of this is in materials not produced in Canada. During recent months there has been general improvement in demand for reinforcing bars as a result of greater activity in building. Sheets also have an active call, with heavy buying reported from practically all consuming centers. With sheet imports suspended from Great Britain, consumers and jobbers have been buying more extensively from Canadian mills and the latter are running at full time to take care of demand and are somewhat behind in deliveries. There also have been larger imports of sheets from the United

States by consumers in need of supplies for spot needs, but it is understood that these consumers are paying a premium.

Merchant pig iron sales are steady but confined to spot delivery orders. Local blast furnace representatives look for increased contracts for last quarter and state that there is a better demand developing from the radiator and sanitary ware companies. Imple-

ment makers are taking regular deliveries of iron against contract while others are placing regular orders for spot delivery. Many melters are carrying only small stocks at their plants. Prices are firm.

Scrap demand is steady for both steel and iron grades and both Toronto and Montreal dealers have been making substantial shipments from yard holdings.

Manufacturers Have A Word For It ~

BISCO

When manufacturers need alloy or tool steel tubing they call for Bisco. They know we devote all of our time and energies to this one type of product, and the product reflects the skill in its making.

Quick delivery on Tool Steel Tubing, Ball Bearing Tubing, Stainless Tubing, Aircraft Tubing, Cold Drawn Mechanical Tubing, A.S.M.E. Boiler Tubing.

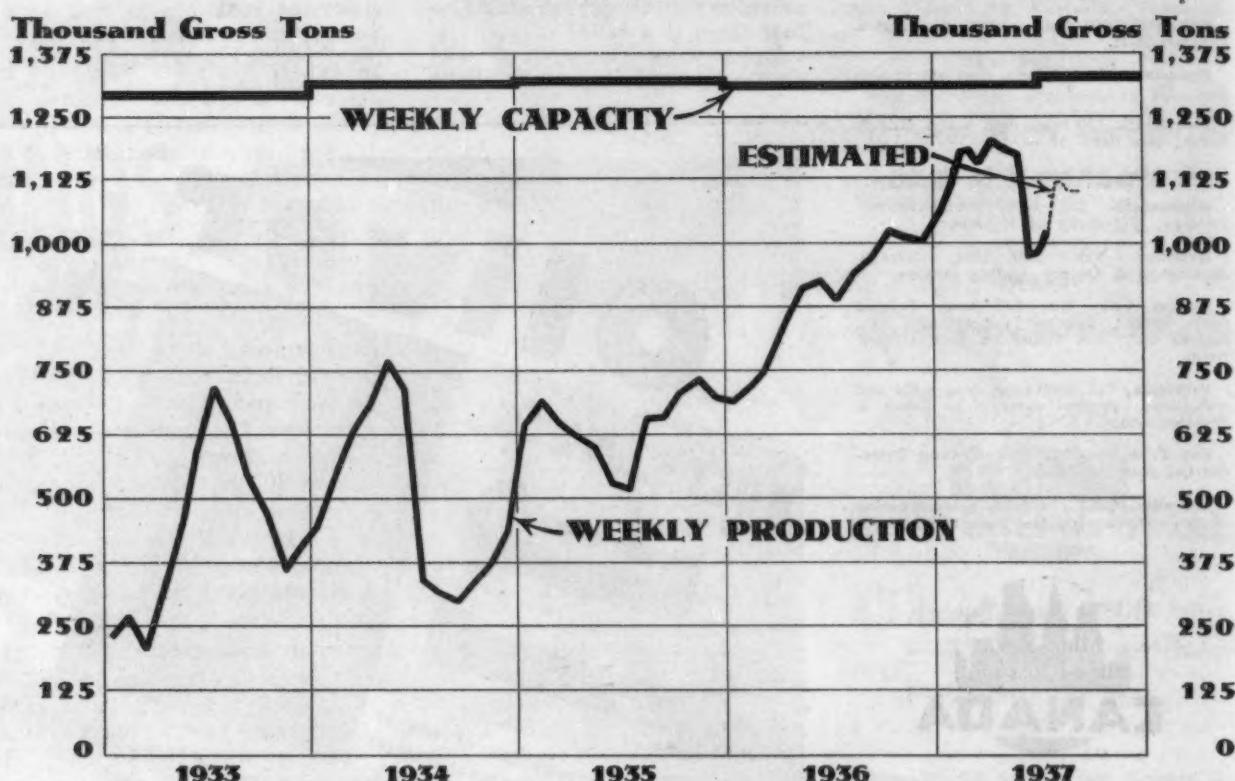
Call Bisco for tool steel tubing.

THE BISSETT STEEL COMPANY

*The Tubing Specialists
Cleveland, O.*

PRODUCTION

Average Weekly Production of Open-Hearth and Bessemer Steel Ingots by Months, 1933-1937, and Estimated Production by Weeks in 1937



Figures for the Current Week Are Not Indicated on the Chart Until the Following Week

STEEL INGOT PRODUCTION BY DISTRICTS: Per Cent of Capacity

	Current Week*	Last Week
Pittsburgh	65.0	82.0
Chicago	72.0	86.0
Valleys	63.0	81.0
Philadelphia	56.5	68.0
Cleveland	59.0	77.0
Buffalo	72.0	88.5
Wheeling	82.0	97.0
Southern	59.5	71.5
Ohio River	76.0	93.0
Western	79.0	95.0
St. Louis	58.0	81.5
Detroit	79.0	100.0
Eastern	81.5	98.0
Aggregate	70.0	83.0

*Allowance made for holiday.

Weekly Booking of Construction Steel

	Sept. 8, 1937	Aug. 31, 1937	Aug. 10, 1937	Week Ended	Sept. 9, 1936	Year to Date
					1937	1936
Fabricated structural steel awards.....	24,400	6,515	26,800	21,135	807,765	781,490
Fabricated plate awards.....	925	2,275	0	680	72,270	176,645
Steel sheet piling awards.....	105	0	730	555	41,260	40,350
Reinforcing bar awards.....	3,200	3,170	6,635	2,870	197,685	257,185
Total Lettings of Construction Steel...	28,630	11,960	34,165	25,240	1,118,980	1,255,670

... .SUMMARY OF THE WEEK. . . .

... *Steel operations lower because of holiday and light buying.*

• • •

... *Steel scrap weaker; 250,000 tons sold to British cartel.*

• • •

... *Pig iron production in August highest since September, 1929.*

STEEL companies continue to expect a gradually rising trend in new business this month, but there is a question whether volume demand will come in sufficient time to forestall a dropping of the ingot production rate over the next few weeks. Automotive buying, which had been counted upon to lift backlogs, has gained moderately, but not to the extent or as rapidly as had been expected.

Meanwhile, backlogs of orders at some mills have declined to such a point that recent high mill schedules are not warranted. Some mills have accumulated stocks of ingots and will slow down open-hearth production until these stocks are used. Orders are needed for nearly all products except tin plate, galvanized sheets and line and oil well pipe, in which there are still comfortable backlogs.

This week's drop in ingot output to 70 per cent from an estimated 83 per cent last week was occasioned partly by the Labor Day holiday, which brought an almost complete shutdown of steel-making facilities, though it is not counted as a steel mill holiday in statistical reckoning, and partly by an adjustment of operating schedules to a lower business volume. Some mills are operating on a five-day basis at the pre-holiday rate, while others are below their last week's output. The sharpest drops occurred in the Cleveland-Lorain and Youngstown districts, amounting to 18 points. There were only slightly smaller declines in other areas. It would appear that next week's rate will be somewhere between 80 and 82 per cent.

STEEL scrap prices are reflecting the easier mill situation together with the growing uncertainty as to a continuance of exports to Japan. A new sale of 250,000 tons has been made, however, to the British scrap cartel at prices at least \$2 a ton higher than on the previous purchase and substantially in line with current domestic prices, allowing for freight to seaboard. Steel companies are buying very little scrap, and brokers have reduced their offers, bringing a decline of 50c. a ton at Pittsburgh and 75c. at Chicago, with no change at Philadelphia. THE IRON AGE composite price

has dropped to \$19.75, almost half way between the high and low for the year.

Other than the scrap sale, there has been a quieting down in export business. Japanese inquiries are quiescent. Shipments against old orders are going out. British inquiries are prevalent, particularly for semi-finished steel, but prices offered are sometimes below domestic quotations, whereas substantial premiums were recently being obtained. Machine tool inquiry from abroad has expanded. Russia is asking for prices on 80 turret lathes, and there are some inquiries also from Japan.

Structural steel business, which has suffered from summer dullness, looks somewhat brighter. Lettings of 24,500 tons included 11,100 tons for a bridge at Baton Rouge, La., and 7500 tons for the West Side elevated highway, New York. New projects totaling about 30,500 tons are headed by 18,000 tons for the main span of the Bronx-Whitestone bridge, New York; 3000 tons for a trestle over the Riker's Island channel, New York; and 2200 tons for an Edison plant in South Boston.

PIG iron production in August totaled 3,605,818 gross tons, up 3 per cent over July, based on the daily rate of 116,317 tons, against 112,866 tons. The August daily rate was the highest since September, 1929, when it was 116,585 tons. The eight-month total is 26,811,269 tons, against 18,834,215 tons in the corresponding period last year. There were 191 furnaces in blast on Sept. 1, a loss of one during the month.

Steel ingot output also gained in August, the total of 4,861,789 gross tons having been 6.7 per cent over the 4,556,596 tons of July. The eight-month total was 38,183,018 tons, against 29,374,754 tons in the like period of 1936. An average operation of 75 per cent over the last four months of the year would beat the all-time record of 54,312,279 tons of open-hearth and bessemer ingots in 1929.

New high records are being made also in water movement of Lake Superior ore. The August receipts of 10,811,381 gross tons exceeded by 4114 tons, the previous high record for the month in 1929. Water shipments to Sept. 1 were 1,720,244 tons larger than the total up to that date in 1929. It is possible that the total by the end of the season will exceed the record water movement of 65,195,595 tons in 1929.

PRICE changes in steel include a new jobber-dealer selling arrangement in merchant wire products, affirmation of present prices on rivets for the fourth quarter, and advances of 4 or 5 per cent on stove bolts, machine screws and machine nuts. High-speed tool steel will be advanced from 67c. to 80c. a lb., base, on Oct. 1, owing to increased costs of tungsten brought about by the situation in China.



...Steel operations sharply reduced, principally by Labor Day holiday.

• • •
...Orders are slightly improved; bulk of automotive buying still to come.

• • •
...New jobber-dealer set-up on merchant wire items; steel scrap lower.

PITTSBURGH, Sept. 8.—Observance of the Labor Day holiday reduced ingot operations this week to 65 per cent of capacity in the Pittsburgh district and to 82 per cent in the Wheeling district. After the holiday both districts returned to practically the levels in force last week.

Specifications are slightly better, excluding the holiday. Most of the expected automotive purchases are still hanging fire, but receipt of some of this tonnage is looked for in the near future. Railroad buying is at a low point and bookings of structural shapes also are light. Operations at tin plate mills remain well above 100 per cent, with producers striving to complete shipments by Sept. 30. Tubular goods producers are active.

Wire producers have extended to the country as a whole the jobber-dealer set-up that has been in effect in southern states for merchant wire items, with a functional allowance of 10c. per 100 lb. for jobbers and dealers.

Effective Oct. 1, high-speed tool steels will be advanced to 80c. a lb., base. The 18-4-1 grade, which contains 18 per cent tungsten, is at present 67c. a lb. Standard alloy tool steel prices will be unchanged. The difficulty in obtaining tungsten, owing to the war in the Far East, is a primary factor in the advance.

No. 1 heavy melting steel is off 50c. to \$21 to \$21.50 a ton and other grades are lower. Activity has been lacking as far as mill buying is concerned.

and producers confidently expect September to be more active than last month. Two automobile manufacturers have specified for part of their needs for the near future. Others in the automotive trade are expected to make known their requirements soon. Among other consumers, probably textile machinery manufacturers have been most active. Inquiries from several small European countries have been noted recently.

Reinforcing Bars

The volume of inquiries under 1000 tons for reinforcing bars continues to be fairly well maintained, but larger projects are lacking. Mellon Art Museum, Washington, will require 800 tons. Awards during the past week also were fairly well maintained, but failed to include any tonnages of outstanding importance.

Plates and Shapes

Structural shape inquiries are headed this week by 3000 tons for a temporary trestle over the Rikers Island Channel at Queens, N. Y., and 2300 tons for extension work by the Boston Edison Co., Boston. A garage for the city of New York will require approximately 900 tons. Outside of these three projects and several New York school jobs requiring approximately 750 tons apiece, pending work is light. Awards also have fallen off sharply during the past week. Plate producers report demand less active, largely due to the quieter situation in the railroad equipment and tank fabricating fields.

Sheets

Automotive buying has resulted in improvement in the steel sheet market, although this has not yet extended delivery promises any further. Placing of more automotive business is anticipated soon, one manufacturer having delayed his specifications until probably some time late this week. Backlogs continue largest in galvanized and hot rolled annealed. Miscellaneous demand has been only fair recently.

Wire Products

The jobber-dealer set-up in Southern states for merchant wire items has been extended to the country as a whole by wire producers. Previously Northern practice allowed a 15c. a 100 lb. functional discount for bona fide jobbers. The extended practice carries a functional allowance of 10c. a 100 lb. to jobbers and dealers. Quantity deductions are also given to purchasers for shipment at one time to one purchaser to one destination, ranging from 5c. to 15c. a 100 lb. Details on the plan are

Pig Iron

Demand for third quarter pig iron is a little heavier, while the placing of contracts for fourth quarter continues at a moderate rate. Since some consumers plan to maintain their stocks at close to their present comfortably large levels, shipments are expected to hold up. Export inquiry has been quiet in this district.

Semi-Finished Steel

Schedules for September are considerably better than in August, owing to recent export bookings in addition to requirements of non-integrated mills. New foreign inquiries are being circulated, but the prices these buyers seek are much less attractive than those commanded last spring and in many cases under the current domestic rates. Shipments to domestic consumers appear likely to be heavier over the remainder of this month.

Bars

New business in hot rolled bars has shown improvement during the last two weeks and further gains are expected. Fairly prompt deliveries are still obtainable, however. While miscellaneous requirements are slightly better, most of the impetus is expected to be provided by the automobile industry. The necessity of rebuilding stocks has resulted in buying by some jobbers.

Cold Finished Bars

Deliveries continue easy. Bookings have been gaining recently

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Rails and Semi-finished Steel

	Sept. 8, 1937	Aug. 31, 1937	Aug. 10, 1937	Sept. 9, 1936
Per Gross Ton:				
Rails, heavy, at mill.....	\$42.50	\$42.50	\$42.50	\$36.37 $\frac{1}{2}$
Light rails, Pittsburgh.....	43.00	43.00	43.00	35.00
Rerolling billets, Pittsburgh.....	37.00	37.00	37.00	30.00
Sheet bars, Pittsburgh.....	37.00	37.00	37.00	30.00
Slabs, Pittsburgh.....	37.00	37.00	37.00	30.00
Forging billets, Pittsburgh.....	43.00	43.00	43.00	37.00
Wire rods, Nos. 4 and 5, P'gh	47.00	47.00	47.00	38.00
Cents	Cents	Cents	Cents	
Skelp, grvd. steel, P'gh, lb.	2.10	2.10	2.10	1.80

Finished Steel

Per Lb.:	Cents	Cents	Cents	Cents
Bars, Pittsburgh.....	2.45	2.45	2.45	1.95
Bars, Chicago.....	2.50	2.50	2.50	2.00
Bars, Cleveland.....	2.50	2.50	2.50	2.00
Bars, New York.....	2.78	2.78	2.78	2.30
Plates, Pittsburgh.....	2.25	2.25	2.25	1.90
Plates, Chicago.....	2.30	2.30	2.30	1.95
Plates, New York.....	2.53	2.53	2.53	2.19
Structural shapes, Pittsburgh.....	2.25	2.25	2.25	1.90
Structural shapes, Chicago.....	2.30	2.30	2.30	1.95
Structural shapes, New York.....	2.5025	2.5025	2.5025	2.16 $\frac{1}{4}$
Cold-finished bars, Pittsburgh.....	2.90	2.90	2.90	2.25
Hot-rolled strips, Pittsburgh.....	2.40	2.40	2.40	1.95
Cold-rolled strips, Pittsburgh.....	3.20	3.20	3.20	2.60
Hot-rolled annealed sheets, No. 24, Pittsburgh.....	3.15	3.15	3.15	2.50
Hot-rolled annealed sheets, No. 24, Gary.....	3.25	3.25	3.25	2.60
Sheets, galv., No. 24, P'gh.....	3.80	3.80	3.80	3.20
Sheets, galv., No. 24, Gary.....	3.90	3.90	3.90	3.30
Hot-rolled sheets, No. 10, Pittsburgh.....	2.40	2.40	2.40	1.95
Hot-rolled sheets, No. 10, Gary.....	2.50	2.50	2.50	2.05
Cold-rolled sheets, No. 20, Pittsburgh.....	3.55	3.55	3.55	3.05
Cold-rolled sheets, No. 20, Gary.....	3.65	3.65	3.65	3.15
Wire nails, Pittsburgh.....	2.75	2.75	2.75	1.90
Wire nails, Chicago dist. mill.....	2.80	2.80	2.80	1.95
Plain wire, Pittsburgh.....	2.90	2.90	2.90	2.40
Plain wire, Chicago dist. mill.....	2.95	2.95	2.95	2.45
Barbed wire, galv., P'gh.....	3.40	3.40	3.40	2.40
Barbed wire, galv., Chicago dist. mill.....	3.45	3.45	3.45	2.45
Tin plate, 100-lb. box, P'gh.	\$5.35	\$5.35	\$5.35	\$5.25

Pig Iron

Per Gross Ton:	Sept. 8, 1937	Aug. 31, 1937	Aug. 10, 1937	Sept. 9, 1936
No. 2 fdy., Philadelphia.....	\$25.76	\$25.76	\$25.76	\$21.31 $\frac{1}{2}$
No. 2, Valley furnace.....	24.00	24.00	24.00	19.50
No. 2, Southern Cin'ti.....	23.69	23.69	23.69	19.44
No. 2, Birmingham†.....	20.38	20.38	20.38	15.88
No. 2, foundry, Chicago*.....	24.00	24.00	24.00	19.50
Basic, del'd eastern Pa.....	25.26	25.26	25.26	20.81 $\frac{1}{2}$
Basic, Valley furnace.....	23.50	23.50	23.50	19.00
Malleable, Chicago*.....	24.00	24.00	24.00	19.50
Malleable, Valley.....	24.00	24.00	24.00	19.50
L. S. charcoal, Chicago.....	30.04	30.04	30.04	25.25 $\frac{1}{2}$
Ferromanganese, seab'd, car-lots.....	102.50	102.50	102.50	75.00

†This quotation is subject to a deduction of 38c. a ton for phosphorus content of 0.70 per cent or higher.

*The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Scrap

Per Gross Ton:	Heavy melting steel, P'gh.....	\$21.25	\$21.75	\$22.00	\$17.50
Heavy melting steel, Phila.....	19.75	19.75	19.75	15.00	
Heavy melting steel, Ch'go.....	18.25	19.00	19.75	16.25	
Carwheels, Chicago.....	19.25	19.75	19.75	16.00	
Carwheels, Philadelphia.....	20.75	20.75	20.75	16.25	
No. 1 cast, Pittsburgh.....	20.25	20.25	20.25	15.75	
No. 1 cast, Philadelphia.....	20.75	21.25	21.25	16.75	
No. 1 cast, Ch'go (net ton).....	15.25	15.75	16.75	13.50	
No. 1 RR. wrot., Phila.....	20.75	20.75	19.75	14.75	
No. 1 RR. wrot., Ch'go (net).....	15.75	16.25	19.75	14.25	

Coke, Connellsburg

Per Net Ton at Oven:	Furnace coke, prompt.....	\$4.35	\$4.35	\$4.35	\$3.65
Foundry coke, prompt.....	5.00	5.00	5.00	5.00	4.00

Metals

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Electrolytic copper, Conn.....	14.00	14.00	14.00	9.75
Lake copper, New York.....	14.12 $\frac{1}{2}$	14.12 $\frac{1}{2}$	14.12 $\frac{1}{2}$	9.87 $\frac{1}{2}$
Tin (Straits), New York.....	58.75	58.75	60.125	45.20
Zinc, East St. Louis.....	7.25	7.25	7.25	4.85
Zinc, New York.....	7.60	7.60	7.60	5.22 $\frac{1}{2}$
Lead, St. Louis.....	6.35	6.35	6.35	4.45
Lead, New York.....	6.50	6.50	6.50	4.60
Antimony (Asiatic), N. Y.....	17.50	17.00	15.375	12.50

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

The Iron Age Composite Prices

Finished Steel

Sept. 8, 1937
One week ago
One month ago
One year ago

2.605c. a Lb.
2.605c.
2.605c.
2.159c.

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.

Pig Iron

\$23.25 a Gross Ton
23.25
23.25
18.73

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Steel Scrap

\$19.75 a Gross Ton
20.17
20.50
16.25

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

HIGH LOW
1937..... 2.605c. Mar. 9: 2.330c. Mar. 2
1936..... 2.330c. Dec. 28: 2.084c. Mar. 10
1935..... 2.130c. Oct. 1: 2.124c. Jan. 8
1934..... 2.199c. Apr. 24: 2.008c. Jan. 2
1933..... 2.015c. Oct. 3: 1.867c. Apr. 18
1932..... 1.977c. Oct. 4: 1.926c. Feb. 2
1931..... 2.037c. Jan. 13: 1.945c. Dec. 29
1930..... 2.273c. Jan. 7: 2.018c. Dec. 9
1929..... 2.317c. Apr. 2: 2.273c. Oct. 29
1928..... 2.286c. Dec. 11: 2.217c. July 17
1927..... 2.402c. Jan. 4: 2.212c. Nov. 1

HIGH LOW
1937..... \$23.25, Mar. 9: \$20.25, Feb. 16
1973, Nov. 24: 18.73, Aug. 11
18.84, Nov. 5: 17.83, May 14
17.90, May 1: 16.90, Jan. 27
16.90, Dec. 5: 15.56, Jan. 3
14.81, Jan. 5: 12.56, Dec. 6
15.90, Jan. 6: 14.79, Dec. 15
18.21, Jan. 7: 15.90, Dec. 16
18.71, May 14: 18.21, Dec. 17
18.59, Nov. 27: 17.04, July 24
19.71, Jan. 4: 17.64, Nov. 1

HIGH LOW
1937..... \$21.92, Mar. 30: \$17.08, June 15
17.75, Dec. 21: 12.67, June 9
13.42, Dec. 10: 10.23, April 23
13.00, Mar. 13: 9.50, Sept. 25
12.25, Aug. 8: 6.75, Jan. 3
8.50, Jan. 12: 6.43, July 5
11.33, Jan. 6: 8.50, Dec. 29
15.00, Feb. 18: 11.25, Dec. 9
17.58, Jan. 29: 14.08, Dec. 2
16.50, Dec. 31: 13.08, July 2
15.25, Jan. 11: 13.08, Nov. 22

printed elsewhere in this issue. Improvement in jobbers' orders has been noted by producers here recently, while new specifications in manufacturers wire have gained a little. The automotive industry's largest releases are still in the offing.

Tin Plate

Bookings for fourth quarter delivery have been very good. Another gratifying factor has been heavier export demand. Meanwhile, mills are pushing to clear certain contract shipments by Sept. 30 and are still under insistent pressure for prompt deliveries. From present indications operations may remain close to their current high rate over the remainder of the year.

Strip

Strip producers are still looking forward to the receipt of the bulk of the tonnage from the automotive industry, although some releases from parts makers have been received. A few consumers recently have been ordering better, possibly through a desire to get on mill

schedules ahead of the expected increase in automotive demand. Deliveries continue easy.

Tubular Goods

Producers of tubular goods in this district entered September with fair backlogs. In some cases backlogs are more extended than in other finished steel lines. Incoming business, however, has been light during the past month. Demand for oil-country goods, the largest factor in the high rate of activity, continues fair. While standard pipe has been quiet, some pick up is expected in preparation for winter heating requirements.

Coal and Coke

The Labor Day holiday was observed throughout the Connellsville, Pa., beehive coke region, ovens being charged heavily late last week, and operations returned to normal Tuesday. Only a slight improvement in demand has been noticed recently, spot requirements continuing light. Further gains are anticipated later this month and in October.

in the past week in lots ranging from single carloads up to 400 tons.

Buying of sheets from district mills was better during August than is usual for that month. Ordering by automobile companies is turning upward, with prospects for substantial business this month. The high rates at which mills have been operating have reduced backlogs. Delivery promises are now almost normal.

Open-hearth operations in this district are a few points lower at 89 per cent of capacity. One furnace was taken off for repairs, but will be back in service by the end of the week.



Butler, Ky., plans 2, 4 and 6-in. pipe lines for water distributing system; also installation of turbine pumping machinery and accessories, and 50,000-gal. elevated steel tank and tower. Cost \$31,500. Financing is being arranged through Federal aid.

General Purchasing Officer, Panama Canal, Washington, asks bids until Sept. 13 for 2000 ft. of 16-in., 1700 ft. of 8-in., and 3000 ft. of 6-in. cast iron water pipe (Schedule 3285).

Wellsville, Ohio, plans pipe lines for extensions in water system and other waterworks installation. Cost about \$130,000. R. M. Hunter, Wooster, Ohio, is consulting engineer.

Portsmouth, Ohio, plans main pipe line for water system in parts of Massie and Second Streets. Cost about \$41,000. C. S. Stevenson is city engineer.

Macclenny, Fla., plans pipe lines for water system; also other waterworks installation, including pumping station. Fund of \$50,900 is being arranged through Federal loan and grant.

Amite City, La., plans extensions in water pipe lines; also other waterworks installation. Fund of \$57,000 is being secured through Federal grant and loan. E. G. Frelier, Hammond, La., is consulting engineer.

Dewey, Okla., plans 8-in. pipe line from Bar-Dew Lake, water source, to municipal limits, about four miles, for main water supply; also other waterworks installations. Cost about \$66,000.

Mountain View, Mo., plans pipe lines for water system; also other waterworks equipment. Cost about \$51,000. Financing is being arranged through Federal aid. Beard Engineering Co., 2606 Oakview Terrace, Maplewood, Mo., is consulting engineer.

Woodston, Kan., plans pipe lines for water system; also 50,000 gal. elevated steel tank and tower. Cost about \$23,600. Financing is being arranged through Federal aid. Hefling & Hughes Engineering Co., West Second Street, Hutchinson, Kan., are consulting engineers.

Long Beach, Cal., plans 4902 ft. of 6-in., 948 ft. of 8-in., and 618 ft. of 12-in. for water system in parts of Oregon, Golden and San Francisco Avenues.

Los Angeles, Department of Water and Power has awarded 1900 tons to United States Pipe & Foundry Co. and 300 tons to American Cast Iron Pipe Co.



... Water system and graving dock may bring large steel awards.

SAN FRANCISCO, Sept. 7.—Interest centers in the Palos Verdes feeder of the Colorado River distribution system near Los Angeles on which bids were opened last week. This project, depending upon the alternate accepted, calls for between 2000 and 11,000 tons of steel and will probably be awarded within the next two weeks. Of interest also is the expected award of from 3000 to 10,000 tons of sheet steel piling involved in the construction of a graving dry dock at Mare Island, Calif. George Pollock of Sacramento is general contractor.

The Los Angeles Department of Water and Power has awarded 2200 tons of cast iron pipe; 1900 tons to U. S. Pipe & Foundry Co., and 300 tons to American Cast Iron Pipe Co. The material will be used in improvement of water supply systems. Awards in all forms of steel were unimportant and ag-

gregates were small. Backlogs have almost entirely disappeared and deliveries may be had almost immediately.

An allotment of \$4,000,000 has been made to the Sacramento Municipal Utility District, Sacramento, Calif., by the PWA for construction of a steam-electric generating plant and distribution system. Estimated total cost of the project is \$12,000,000.



... Pig iron business takes turn for better.

CINCINNATI, Sept. 8.—Pig iron sales, which have been dull for some weeks, made a decided turn for the better in the past week, which furnace interests believed to be a forerunner of the fall demand. Reports indicate melters have very little iron in their yards. Agricultural and stove melters are operating at near capacity, but activity is not so brisk in machine tool and general jobbing foundries. Southern furnaces sold about 2000 tons of iron



... Ingot production down to 72% this week because of the holiday.

... Backlogs are declining and new business improvement is small.

... Curtailment in operations expected within a few weeks.

CHICAGO, Sept. 8.—As a result of Labor Day shutdowns in steel plants here, ingot output this week declined 14 points to 72 per cent of capacity. Production, however, for the five-day period continued at practically the same rate as has been maintained for the past few weeks. With little change being forecast for next week, the level of mill operations will be about the same as in the pre-holiday week.

Sales and specifications are holding even with last week, although there is still no change in the downward movement of backlogs. One mill reports that because of an unusually good response from forgers over the past few weeks, shipments and orders are about on a par. If present conditions continue for long, however, operations will necessarily be curtailed for the district as a whole.

One of the leading factors in this market is predicting the worst quarter of the year for the fourth period, and a good 1938. Except for some flat-rolled products, the unfilled orders for this particular mill are sufficient to last, at current operating rates, only for about a month, at which time, unless more business is received meanwhile, at least two mills will be shut down and the men laid off temporarily.

The automobile and farm equipment industries provide the chief bright spots in the picture here, the former being expected to swing into heavy production by Sept. 20 or 25, and the latter to continue at its current rate of capacity operations throughout the year at least. Many orders for steel for 1938 cars have already been placed with Chicago mills, but more are

expected to come, since some of the orders have been for experimental or first runs only. The farm equipment business is as good as ever and shows no signs of slowing down. One maker is reported to be planning to double its production of combines, and is said to be trying to get into production two weeks earlier than usual.

In Rockford, one of the largest building projects ever to be planned there, a new plant for the Mechanics Universal Joint Co., a Borg-Warner subsidiary, will be started at once. To cover five and one-half acres of ground area, the new one-story factory will be of steel, concrete and brick, and will replace the present plant. Construction will be rushed as much as possible before winter.

Mill purchases at \$18.50 and mill limitations on shipments, combined with an increase in the flow of scrap into this center, have caused brokers' bids for No. 1 heavy steel to drop to \$18, delivered. The market this week, consequently, is quoted at \$18 to \$18.50.

Pig Iron

August shipments, both of pig iron and foundry coke, were greater than in July, and September is expected to show an increase over August. One of the main factors influencing this movement is the renewal of work in automobile foundries, although general foundries and those casting for makers of farm and electrical equipment and machine tools have been important contributors to the total also. Railroad foundries are still busy on old orders, but little new work is in sight for them. Inventories have been built up to fairly high levels generally, but a continuation of buying is expected.

Wire and Wire Products

With orders and specifications from farm equipment manufacturers, machine tool builders and general customers being received at an unchanged high rate, and the automobile industry expected to begin large-scale buying for 1938 models between Sept. 20 and Sept. 25, wire sellers are looking forward to a good fall season. Spring wire is being actively used in new car production. Demand from rural areas is increasing slightly, but the real buying from these districts is not expected for several weeks.

Plates

With railroad interest still lacking, plate mills are finding most of their business among tank makers, structural fabricators and miscellaneous users. Fourth quarter sales are not expected to be large, although optimism for 1938 has not diminished.

Bars

The peak of automobile purchasing still being before them, bar sellers are far from pessimistic over fourth quarter prospects. Deliveries require from three to four weeks generally, although this quotation may be lengthened later in the month when additional orders are booked. Specifications are steady from the implement and tractor makers, machine tool companies and general consuming trade.

Sheets and Strip

Releases from Detroit are coming into this market in fair volume and are the most important factor in the sheet picture here for the fall months. Producers are counting on high assemblies to bring up demand for sheets to the point where it will counteract to some extent the lagging business in other steel lines. Sheet fabricators around Chicago, whose business has been only fair over the summer, anticipate an increase soon. Inquiries from surrounding states indicate that considerable flat rolled steel is being consumed for furniture, road construction and other purposes.

Warehouse Business

August business was slightly better than that in July. Demand is well diversified, both as to products and consumers. Stocks are well rounded out; the sheet shortage, which was marked during and following the steel strikes, has been remedied. Jobbing houses are anticipating increased business later

this month leading into an exceptionally good October.

Structural Shapes

Structural projects in this district continue scarce and inquiries do not indicate any important work forthcoming for the remainder of this month at least. In October there may be some State road work, including bridges, which will require fair tonnages. Little else is in sight.

Russia Expanding Manganese Output

ACCORDING to the draft figures of the Chiatura (Russia) manganese industry, the output of manganese ore by the last year of the Third Five-Year Plan will be increased to 2,500,000 tons. This year the output of Chiatura manganese is estimated at 1,650,000 tons.

Under the Russia Third Five-Year Plan existing mines will be enlarged, and two new mines will be sunk. One of the latter (the Porokhnal-Shukrutsky) will be the largest ore mine in Chiatura; raising and haulage processes will all be mechanized.

Farm Equipment Exports Gaining

UNITED STATES exports of farm equipment have increased steadily during the current year to \$8,186,409 in July, the highest monthly value since February, 1931, and 108 per cent above the July, 1936, shipments valued at \$3,926,140, according to the Machinery Division of the Department of Commerce.

Substantial gains were recorded in practically all types of farm implements and machinery, but particularly in the major groups, tractors, harvesting machinery, and cultivating implements. Owing to the steady rise in sales so far this year, the first seven-month shipments amounting to \$42,690,170 are only slightly below the total 1936 exports valued at \$43,993,315.

Foreign purchases of American tractors and parts during July totaled \$5,271,521, 140 per cent above the July, 1936 figure of \$2,198,752.

Steel Ingot Output 4,861,789 Tons in August; 6.7% Gain Over July

PRODUCTION of open hearth and Bessemer steel ingots during August reached a total of 4,861,789 gross tons, an increase of 6.7 per cent over the July total of 4,556,596 gross tons, according to the American Iron and Steel Institute.

The August figure was more than 16 per cent above the output of 4,184,287 gross tons in August, 1936, but failed to equal August, 1929, when 4,939,086 gross tons was produced.

Total production in the first eight months of this year was 38,183,018 gross tons, against 29,374,754 gross tons in the like period of 1936, and 38,825,943 gross tons in the first eight months of 1929.

During August the steel industry operated at an average rate of 83.55 per cent of capacity, which

compares with 78.49 per cent in July and 72.11 per cent in August, 1936.

Steel production during August was calculated at 1,097,469 gross tons of ingots per week, compared with 1,030,904 gross tons per week in July and 944,534 in August of last year.

Pratt & Whitney Gets Large Engine Order

WASHINGTON, Sept. 8.—The War Department has awarded an airplane engine contract totaling \$4,153,938 to the Pratt & Whitney division of the United Aircraft Corp. This amount covers 455 engines and spare parts.

PRODUCTION OF OPEN-HEARTH AND BESSEMER STEEL INGOTS

(Reported by Companies Which in 1936 Made 98.29 Per Cent of the Open-Hearth and 100 Per Cent of the Bessemer Ingot Production)

1936	Reported Production (Gross Tons)		Calculated Monthly Production All Companies			Number of Weeks	Per Cent of Capacity
	Open-Hearth	Bessemer	Monthly	Weekly			
January	2,794,766	196,389	3,039,804	686,186	4.43	52.39	
February	2,707,320	202,445	2,956,891	714,225	4.14	54.53	
March	3,094,939	185,040	3,333,853	752,563	4.43	57.46	
1st Quarter..	8,597,025	583,874	9,330,548	717,734	13.00	54.80	
April	3,565,761	304,775	3,932,605	914,593	4.29	69.99	
May	3,671,375	302,092	4,037,375	911,371	4.43	69.58	
June	3,578,383	334,897	3,975,589	926,706	4.29	70.75	
2nd Quarter..	10,815,519	941,764	11,945,549	918,182	13.01	70.10	
1st 6 Months.	19,412,544	1,525,638	21,276,097	817,997	26.01	62.45	
July	3,526,380	326,606	3,914,370	885,604	4.42	67.61	
August	3,768,135	350,560	4,184,287	944,534	4.43	72.11	
September	3,782,498	303,048	4,151,388	969,950	4.28	74.05	
3rd Quarter..	11,077,013	980,214	12,250,045	932,981	13.13	71.23	
1st 9 Months.	30,489,557	2,505,852	33,526,142	856,570	39.14	65.40	
October	4,144,395	317,710	4,534,246	1,023,532	4.43	78.15	
November	3,925,146	329,553	4,323,025	1,007,698	4.29	76.94	
December	4,048,552	305,342	4,424,367	1,000,988	4.42	76.42	
4th Quarter..	12,118,093	952,605	13,281,638	1,010,779	13.14	77.17	
Total Year..	42,607,650	3,458,457	46,807,780	895,329	52.28	68.36	
1937							
January	4,357,338	291,794	4,724,939	1,066,578	4.43	81.43	
February	4,012,358	331,669	4,413,832	1,103,458	4.00	84.25	
March	4,730,579	403,787	5,216,666	1,177,577	4.43	89.91	
1st Quarter..	13,100,275	1,027,250	14,355,437	1,116,286	12.86	85.23	
April	4,601,620	390,198	5,071,875	1,182,255	4.29	90.27	
May	4,685,749	386,290	5,153,559	1,163,332	4.43	88.82	
June	3,832,514	284,572	4,183,762	975,236	4.29	74.46	
2nd Quarter..	13,119,882	1,061,060	14,409,196	1,107,548	13.01	84.56	
1st 6 Months.	26,220,158	2,088,310	28,764,633	1,111,891	25.87	84.89	
July	4,148,389	336,035	4,556,596	1,030,904	4.42	78.49	
August	4,441,610	373,428	4,861,789	1,097,469	4.43	83.55	

1936 figures revised.



... CLEVELAND ...

... Ingot output much lower, reflecting smaller business and holiday shutdown.

... Backlogs reduced to an extent that most mills are in need of new orders.

... Automotive steel for new models has not come out in tonnage expected.

CLEVELAND, Sept. 8.—Ingot output in both the Cleveland-Lorain and the Youngstown districts dropped 18 points this week, going down to 59 points in the former and to 63 points in the Youngstown area. The sharp decline was caused in part by the Labor Day holiday and in part by the slowing down of operations because mills do not have enough tonnage on their books to warrant the maintenance of recent schedules. Some have accumulated stocks of ingots and have reduced their active open hearths until these stocks are used up.

While orders for finished steel are coming out in slightly better volume than during the early part of August, shipments have continued in excess of new specifications and backlogs have been reduced to an extent that mills need orders for practically all products except tin plate, galvanized sheets and line and oil well pipe.

After adhering to high operating rates all through the summer, mills now have caught up with their orders and the increase in the demand so far has not been sufficient to enable them to keep up their recent production rates.

Automotive tonnage for new models has not come out in the volume or as rapidly as expected and some of the steel placed by motor car manufacturers has not been released. Plants of miscellaneous consumers continue busy, but these are using up old stocks, some of which have been quite large. With the present easy delivery situation, purchasers of steel have no incentive to buy far ahead. Uncertainty as to the volume of their business dur-

ing the fall evidently also is causing some consumers to hesitate in making steel commitments. Steel makers look for a more active demand from the motor car manufacturers during the next two weeks and expect the autumn revival of miscellaneous steel business to get under way this month.

While the steel market is lagging, pig iron shows more activity.

Rivet prices have been reaffirmed for the fourth quarter and slight advances have been made on stove bolts in packages.

Pig Iron

Sales for the fourth quarter gained the past week and included some fair-sized lots. New business came from the agricultural implement, pump and compressor manufacturers, motor car foundries, the heating equipment industry, and jobbing foundries. New releases for September shipment indicate quite a gain over August and shipments during the latter month totaled more than had been expected, one leading producer having shipped only about 5 per cent less iron last month than during July. This producer already has enough iron on its books to maintain the August rate of shipment during the remainder of the year. A leading motor car manufacturer has issued releases for September shipment. Demand for foundry coke, a barometer of foundry operations, has improved.

Sheets and Strip

New demand for these products was rather light during the past week. Not much business came

from the automotive industry which, however, is expected to make sizable purchases during the next two weeks. Some of the tonnage recently placed by the motor car manufacturers has not yet been released. Miscellaneous demand is slow. Many plants, particularly those making refrigerators and other household equipment, are maintaining good operations but still have sizable stocks and in some cases have deferred shipments. Mills need new orders for all grades of sheets except galvanized in order to maintain present operating schedules.

Bolts, Nuts and Rivets

Rivet manufacturers have reaffirmed for the fourth quarter the present price of \$3.60, Pittsburgh and Cleveland, and \$3.70, Chicago and Birmingham, for large rivets, and 65 and 5 per cent off list for small rivets. An advance of 4 to 5 per cent on stove bolts in packages has been announced for the coming quarter, and a similar advance on machine screws and machine nuts in packages. Bolt and nut business during August was 10 to 15 per cent less than in July. With fall buying starting, considerable improvement is expected this month.

Wire and Wire Products

Demand shows a slight improvement in nearly all lines, although the gain is not very pronounced because of delays in releases from motor car manufacturers for bolts for new models. Jobbers are placing some orders to replenish stocks. The new quantity sales plan for merchant wire products, announced by the American Steel and Wire Co., is being adopted by other producers.

Iron Ore

Water shipments of Lake Superior ore during August were 10,811,381 tons. That the expected movement of 11,000,000 tons was not reached was entirely due to fogs, which delayed dispatch of boats from the loading ports during the last two or three days of the month. However, August broke by 4114 tons the previous high record for the month established in August, 1929. The August movement was 106,924 tons heavier than in July and showed a gain of 3,366,937 tons, or 45.23 per cent, over August last year. The water movement until Sept. 1 was 45,438,131 tons, an increase of 19,156,614 tons, or 72.89 per cent, over the same period last year. Water shipments until Sept. 1 exceeded by 1,720,244 tons the heaviest previous movement up to that date made in 1929. If water shipments during the remainder of the

season are no heavier than the corresponding months last year, the water movement for the season will be approximately 64,000,000 tons. However, all indications point to a considerably heavier movement during the remainder of the season than after Sept. 1 last year, and the record water movement of 65,195,595 established 1929 is likely to be broken.

Bars, Plates and Shapes

While the motor car industry is reported to have been placing bars somewhat more freely the past week, local mills and sales offices have not noticed an improvement. Miscellaneous demand also continues light. Activity in the construction field has improved. Timken Steel & Tube Co., Canton, has placed 800 tons with the American Bridge Co. for steel plant extensions. The Ohio State Highway Department took bids during the week for three bridges requiring 460 tons and additions to the plant of the Brewing Corp. of America in Cleveland will take 500 tons. Plates continue very dull.

Open hearth operation continues unchanged with Bethlehem's Lackawanna plant using the product of 28 units; Republic, six, and Wickwire-Spencer Steel Company, two, a reduction of one for Republic.

A local fabricator received the contract for 250 tons of reinforcing bar mats for a State road job at Fulton, N. Y., and 105 tons of steel piling for a retaining wall for the city of Ithaca at Cayuga Inlet. Another local concern received the contract to supply 110 tons of bars for work in connection with Scajadua Creek, Buffalo.



..BIRMINGHAM..

**... Mill operations steady;
pig iron buying in small
volume.**

BIRMINGHAM, Sept. 8.—Nashville Bridge Co. has been awarded the contract for furnishing structural steel for the Ball's Ferry bridge in Georgia on a bid of \$108,600. The bridge will require about 1000 tons, which will be fabricated in the company's Bessemer, Ala., plant. Last week Nashville Bridge Co. shipped from its Bessemer plant 150 tons of girders for the Washington Avenue underpass in Mobile, a State highway project.

Fourth quarter pig iron is now being booked by Birmingham furnaces, but new business is still limited. With the base price of \$20 unchanged, new bookings may be slow for the time being. Some foundries are expected to reduce their yard stocks substantially before coming back into the market.

Demand for roofing sheets and wire products is improving. Jobbers and dealers in the farm markets are now stocking in anticipation of the seasonal upturn.

Most mill units are still on full operating schedules and backlog are far from being cleaned up, with the exception of railroad products. The Ensley rail mill, closed on Aug. 27, will not reopen until the new railroad buying season starts. It is hoped that the mill can resume in November.

Last week eight open hearths operated at Fairfield, five at Ensley and five at Gadsden. This week the same number are scheduled. Blast furnaces remain near the top point, with 17 operating.

One Fairfield blast furnace was blown out this week for relining.

The Electro Metallurgical Co., a subsidiary of Union Carbide & Carbon Co., has signed an optional contract with the Tennessee Valley Authority for the purchase of electricity to manufacture electric furnace products in a proposed new plant in the Muscle Shoals district.



Binghamton Gas Works, Binghamton, N. Y., plans extensions in gas pipe lines at Conklin, N. Y. Cost close to \$40,000.

Washington Gas Light Co., 16 Carroll Park, Takoma Park, Montgomery County, Md., plans extensions in gas pipe lines in Boulevard Heights district. Cost close to \$50,000.

Independent Association of Natural Gas Producers of Michigan, Roy F. Ide, Davis-Stott Building, Detroit, representative, is considering new welded steel pipe line from Six Lakes gas field, Mich., to following municipalities for natural gas transmission: Lansing, Flint, Ann Arbor, Battle Creek, Pontiac, Jackson, Kalamazoo, Grand Haven, Holland and Allegan, Mich., about 400 miles in all. Local distribution systems will be installed in different communities, and booster stations at points along route.

Valley Gas Co., Edinburg, Tex., has authorized 6-in. welded steel pipe line from La Blanca gas field area, Tex., to point near Edinburg, close to 10 miles, for natural gas transmission. Cost about \$75,000.

Humble Oil & Refining Co., Houston, Tex., plans new welded steel pipe line from Means oil field, Andrews County, Tex., to Seminole and Wesson oil fields, Gaines County, with extension from latter points to Bennett oil field, Yoakum County, Tex., total distance about 50 miles, for crude oil transmission. Pumping stations will be installed for booster service. Cost close to \$400,000.

American Liberty Pipe Line Co., First National Bank Building, Dallas, Tex., plans 6-in. welded steel pipe line from oil field at Sulphur Bluff, Tex., to point near Weaver, Tex., about eight miles, for crude oil transmission. Pumping stations will be installed for booster service. Cost over \$100,000.

Quemado, Tex., plans pipe lines for natural gas distribution, with main 8-in. welded steel pipe line for connection with line of Texas Gas Distributing Co., about eight miles distant, which will furnish supply. Bond issue is being arranged. Engineering department of Municipal Investment Co., San Antonio, Tex., is making surveys and plans.

Lordsburg, N. M., closed bids Sept. 4 on general construction contract for pipe line system for municipal natural gas distribution, comprising about 40,000 ft. of 2 to 4-in. pipe, with station and other operating facilities. Estimated cost \$127,200. Financing has been arranged through Federal aid. Headman-Ferguson Engineers, Inc., Homebuilders' Building, Phoenix, Ariz., is consulting engineer.

Angle Lake Water District No. 53, King County, C. C. Fallis, Angle Lake Community, Seattle, RFD, clerk, plans steel pipe line for main water supply and distribution system. Cost over \$50,000. Parker & Hill, Smith Tower Building, are consulting engineers.



Utah Copper Co. has placed an order for three caboose cars with Pacific Car & Foundry Co.

Egyptian State Railways are asking bids on 20 flat cars and 20 30-ton gondola cars.

American Car & Foundry Co. has received the following orders for motor coaches: Two for Florida Motor Lines Corp., Jacksonville, Fla.; two for Fitchburg & Leominster Street Railway Co., Fitchburg, Mass.; one for Plymouth & Brockton Street Railway Co., Plymouth, Mass.; and one for Utilities Purchasing & Supply Corp. for Virginia Public Service Co., Hampton, Va.



**... Steel mill operations
only slightly down.**

BUFFALO, Sept. 8.—Bethlehem Steel Co.'s \$20,000,000 strip mill at Lackawanna, N. Y., hung up a new monthly record during August, when it rolled 90,100 gross tons, exceeding a previous monthly record by 15,000 tons, according to an announcement by the company.



NEW YORK

... Dullness in steel trade continues through the holiday week.

... Bronx-Whitestone bridge calls for 18,000 tons of structural steel.

... New York Central asking for bids on 5000 tons of rails.

NEW YORK, Sept. 8.—The dullness in steel buying of August was accentuated in the first week of September by the Labor Day holidays. Many buyers were away from their offices for several days with the result that steel sales volume suffered. Among steel sellers there is a general expectation that the beginning of the fall buying movement will come within the next week or two.

Quietness in domestic business has extended also to foreign inquiry and sales. The Japanese are either unable or unwilling to establish credits here for steel and iron purchases at this time. There are British inquiries in the market, but action is delayed presumably by the political situation in Europe.

The outlook for structural steel is somewhat improved. Bids will be taken next week for 18,000 tons for the main span of the Bronx-Whitestone bridge and an award of 7500 tons of fabricated material for the West Side elevated highway in New York will be made to the Harris Structural Steel Co., which was low bidder. An award of 2500 tons for an enlargement of the Henry Hudson bridge in New York also is expected shortly.

The New York Central is advertising under the Clayton Act for bids on 5000 tons of rails.

Pig Iron

The domestic market is in the doldrums, as is usual in the Labor Day week. New business is light, consisting mostly of small fill-in lots for prompt shipment. Shipments continue to move forward

without interruption, and, although most furnaces are booked well through to the end of the year, the volume of undelivered contracts on hand is steadily diminishing. Furnace stocks are still low and, according to present indications, will probably enter the coming year with little material change. Considering the possibility that shipments should slow up, a number of blast furnaces that have been operating steadily for some time would probably be blown out for repairs. This would hinder stocks from growing to any great extent. Export activity is at low ebb. A few inquiries are still out, but very little business is being written, and outside of a 10,000 ton inquiry for foundry iron from a Continental source, the market is featureless.

Plates and Sheets

Business just prior to the holiday was extremely dull and has shown no appreciable signs of improvement the first part of this week. In the face of a European war scare and a sagging stock market, few new commitments are being made. Scattered orders from the refinery equipment builders are the chief sustaining factor in the local plate market and will continue to provide the bulk of new business expected this month. Another promising field is the shipyards which are releasing specifications against old orders, but have not as yet issued any new ones since the settlement of the strike difficulties. New car and locomotive orders are absent and none is looked for in the next month

or so to sustain this sector of the plate market. Mill backlogs continue to decline and deliveries are as prompt as they have been this year.

Much the same situation holds true of sheet makers, particularly the smaller independents. Incoming business continues to lag behind shipments, and stocks in the hands of both jobbers and manufacturers are high, presenting no real incentive for buying at the present time. Stove makers are very active, however, and are releasing material on old orders in satisfactory volume, but there is little new business from this source.

Wire

Sales of manufacturers' wire have shown an increase in the past fortnight, largely as a result of automotive tonnages. Many jobbers, however, are badly overstocked and little new business is looked for from this source. The construction industries have taken little wire in the last few months.



... Foreign political situation kills pig iron export inquiry.

BOSTON, Sept. 8.—Aside from a 500-ton lot for export, pig iron sales the past week were few and far between. Owing to the foreign political situation there are no export inquiries in the market. A few domestic foundries, mostly the large ones, have ample stocks of iron on hand, but the rank and file will have to purchase for fourth quarter. However, there is little consumer interest at present except for small mixture lots.

Worcester, Mass., industries are busy and expect to be so for some time. There, Norton Co., Heald Machine Co., Wyman-Gordon Co., and G. F. Wright Steel & Wire Co. are completing sizable manufacturing unit additions, while the Fremont Casting Co. is about to start a pattern shop addition. At Springfield, Mass., the Westinghouse Electric & Mfg. Co. and Moore Drop Forge Co. have completed new manufacturing units, but elsewhere in New England, with the exception of Connecticut, few plant expansions have been made.



• • PHILADELPHIA • •

... Operations down to 56½ per cent, due to the vacation.

... Buying still lags, but mills are not greatly concerned.

... Export loadings continue in good volume.

PHILADELPHIA, Sept. 8.—So far, no steel seller has experienced any fall recovery in steel ordering, the result being that deliveries are still outrunning new ordering from 25 to 40 per cent. In general, however, every mill here has at least one month's rolling ahead, with a few producers in even a far better situation. Therefore, before backlogs get down to a serious minimum, there is every prospect that an upturn in miscellaneous demands, automobile requirements, stove building, tank fabrication and allied lines will be of such proportions as to carry producers at a fairly satisfactory pace through the turn of the year. There is no expectation of a dramatic bulge in demand, as the stable price situation precludes such a development.

Sellers view at least one characteristic of the market as most encouraging—no consumer is showing any inclination to delay delivery on old orders or to cancel tonnages on contract, and from all indications all this steel is going steadily into consuming outlets. In fact, the pressure for delivery is still so insistent that producers so far have not slacked off production as backlogs are thinned out, temporarily down to an average of 56½ per cent, due to the vacation, but are most likely to return to 68 per cent next week.

In view of the lack of new demand through October, order books in some mills have held up remarkably well. The probable answer is that considerable export tonnage has been placed during this period, and there is every prospect for additional ordering from abroad. Government export figures for July bear out this observation, the total deliveries of finished and semi-finished steel for that month being at such a high level as to approximate peak exports of the war years.

For July, pig iron exports equaled 168,538 tons, steel ingots totaled 46,318 tons, plate 48,121 tons, tin plate 34,439 tons, black sheets 32,144 tons, structural shapes 22,379 tons and steel bars 18,950 tons.

Some new labor difficulty is causing concern here. About 1200 employees of the J. G. Brill Car Co. are out on a strike, the cause being the failure of one employee to join the union which in turn halts attempts to have a 100 per cent closed shop. An early settlement is unlikely. Also, today the National Labor Board opened its inquiry into the labor practices of Bethlehem Steel Co.; the hearing is being conducted at Johnstown, and will probably last for some months.

Pig Iron

New ordering continues to lag. However, consumer activity has shown some improvement, and a revived interest in iron supplies is expected within the near future, as there are little or no yard stocks overhanging the market. There has been no tendency to delay or cancel contract tonnages. Export loadings from Port Richmond and Baltimore continue in heavy volume, and furnaces are looking forward to fresh foreign inquiry to develop over the balance of the year.

Shapes and Bars

The building industry is at a low ebb, and fabricators are finding themselves in a very discouraging situation, with little tonnage up for estimation and very few important projects in prospect. About the only order for shapes during the week involved 170 tons, for an extension to a duPont building at Carney's Point, N. J., which will be supplied by Belmont Iron Works. The most encouraging block of business in the offing is the list of institutional work of the State of Pennsylvania, covered by a recent Federal grant of \$65,000,-

000. This work will be made up of a large number of small projects, and the first inquiries will be coming out near the end of September.

Wire Products

Demands for manufacturing wire have latterly shown some improvement, but the inflow of orders for merchant wire continues to lag. Deliveries are in no case extended. All sellers have notified their customers that a new selling policy will be put in force, which will put jobbers here on the same basis as southern jobbers have been for some time. Prices have been reaffirmed at 2.75c., base Pittsburgh and Cleveland, with differentials as before for other basing points. Jobbers will be allowed 5c. to 15c. allowances on quantities of over carload size, ordered at one time for delivery to one place, and will be permitted a functional allowance of 10c. per 100 lb. for carload lots. Less-than-carload extras range between 10c. to 50c. per 100 lb.

Sheets and Plates

Plate backlog have been worked to a fairly low level, and delivery on new orders is now possible in three weeks or less. The situation is more extended for sheets, and ordering in all sheet lines has tended to improve slightly. In some cases hot-rolled grades are available in three weeks, although at least one of the larger producers can still do no better than six to seven weeks on hot-rolled, six to seven weeks on pickled, six to nine weeks on cold-rolled, seven to eight weeks on galvanized, seven to nine weeks on long terne, eight weeks on enameling grades, and five to twelve weeks on electrical grades.

Imports

The following iron and steel imports were received here during the past week: 500 tons of iron ore from Persia; 2850 tons of chrome ore from the Philippine Islands; 489 tons of chrome ore from Portuguese Africa; 3285 tons of chrome ore from South Africa; 1233 tons of pig iron from British India; 51 tons of sponge iron, 22 tons of steel tubes, 37 tons of wire rods, 19 tons of steel forgings and 21 tons of steel bars from Sweden; 37 tons of steel bars, 3 tons of steel bands and 76 tons of structural shapes from Belgium.

Hill & Knowlton, who represent Republic Steel Corp., Youngstown Sheet & Tube Co. and other prominent industrial companies in public relations work, have opened an office in the First National Bank Building, Chicago, in addition to their offices in New York and Cleveland.



NON-FERROUS.

... Domestic copper buying light; London market stronger.

... Zinc stocks drop as backlogs rise.

... August tin deliveries total 7580 tons.

NEW YORK, Sept. 8. — The chief feature of the copper market during the past week was the strengthening of the London exchange yesterday and today, due to recent European

political developments which advanced export quotations from the 13.75c. level of the preceding week to as high as 13.95c. per lb., c.i.f., usual European base ports, today. Domestic consumers are showing

The Week's Prices. Cents Per Pound for Early Delivery						
	Sept. 1	Sept. 2	Sept. 3	Sept. 4	Sept. 7	Sept. 8
Electrolytic copper, Conn.*	14.00	14.00	14.00	14.00	14.00	14.00
Lake copper, N. Y.	14.125	14.125	14.125	14.125	14.125	14.125
Straits tin, spot, New York	58.50	58.375	58.625	...	58.50	58.75
Zinc, East St. Louis	7.25	7.25	7.25	7.25	7.25	7.25
Zinc, New York	7.60	7.60	7.60	7.60	7.60	7.60
Lead, St. Louis	6.35	6.35	6.35	6.35	6.35	6.35
Lead, New York	6.50	6.50	6.50	6.50	6.50	6.50

*Delivered Connecticut Valley; price 1/4c. lower delivered in New York.
Aluminum, virgin 99 per cent plus 20.00c.-21.00c. a lb., delivered.
Aluminum No. 12 remelt No. 2 standard, in carloads, 19.00c. to 19.50c. a lb., delivered.

Nickel, electrolytic, 35c. to 36c. a lb. base refinery, in lots of 2 tons or more.
Antimony, Asiatic, 17.50c. a lb., prompt, f.o.b., New York.

Quicksilver, \$92.00 to \$93.00 per flask of 76 lb.

Brass ingots, commercial 85-5-5-5, 14.25c. a lb., less carload, delivered; in

Middle West 1/4c. a lb. is added on orders for less than 40,000 lb.

Tin, bar	64.375c.
Copper, Lake	15.00c. to 15.25c.
Copper, electrolytic	15.00c. to 15.25c.
Copper, castings	14.75c. to 15.00c.
Zinc, slabs	8.75c. to 9.00c.
Lead, American pig	7.00c. to 7.25c.
Lead, bar	10.50c. to 11.00c.
Antimony, Asiatic	17.88c.
Babbitt metal, medium grade	25.50c.
Babbitt metal, high grade	66.375c.
Solder, 1/4 and 1/2	39.50c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	10.875c.	11.625c.
Copper, hvy. and wire	10.25c.	10.75c.
Copper, light and bottoms	9.25c.	9.50c.
Brass, heavy	6.25c.	6.875c.
Brass, light	5.125c.	5.375c.
Hvy. machine composition	9.125c.	9.625c.
No. 1 yel. brass turnings	7.50c.	8.00c.
No. 1 red brass or compositions	8.875c.	9.375c.
Lead, heavy	5.125c.	5.50c.
Cast aluminum	12.125c.	12.25c.
Sheet aluminum	13.25c.	14.75c.
Zinc	4.00c.	4.375c.

*These prices, which are also for delivery from Chicago and Cleveland warehouses, are quoted with 33 1/3 per cent allowed off for extras, except copper tubes and brass rods, on which allowance is 40 per cent.

From Cleveland Warehouse

Delivered Prices per Lb.
Tin Straits pig

very little interest in forward commitments, and sales for this month, through Saturday, totaled only 3259 tons, representing mostly routine bookings of December requirements of company-affiliated fabricators. The domestic price remains unchanged at 14c. per lb., Connecticut Valley, for electrolytic metal.

Zinc

Consumer demand has tapered slightly and, together with the tonnages of foreign spelter that have been imported, the supply position of the metal is somewhat easier, although still far from normal. Preliminary figures issued by the Department of Commerce indicate that zinc imports in August were almost double those in July, and were valued at \$285,864. August statistics on all grades of slab zinc show a rise of 518 tons to 50,643 tons in shipments, and a decrease in production from 49,181 tons in July to 48,309 tons in August. Stocks were reduced to 11,227 tons and unfilled orders rose to 106,187 tons. Deliveries of prime Western for the past week amounted to 5442 tons, and sales totaled 7094 tons. Domestic quotations are unaltered at 7.60c. per lb., New York.

Lead

The stock market weakness, together with the normally slow holiday week, has reduced consumer interest to a low level. The small volume of sales booked during the week were well distributed and consisted essentially of September carload deliveries at the continued firm quotation of 6.50c. per lb., New York. Export prices in London moved upward the past few days in sympathy with the other non-ferrous metals, and touched 4.94c. per lb. today, a rise of 0.14c. over last week's price position.

Tin

The slightly lower level of prices prevailing during the past week engendered a surprising amount of steady buying in both nearby and future position. A feature of the buying was the unusual activity of the tinplate makers who have been long absent from the market. Straits metal in New York today is quoted at 58.75c. per lb. for nearby coverage. Tin sales in London are light in volume in a declining market. On first call in London this morning, Straits metal was quoted at £260 10s for prompt delivery and £259 10s for future. Deliveries of tin in August amounted to 7580 tons, according to the Commodity Exchange, and world stocks increased by 275 tons and stood at 21,019 tons at the end of the month.



IRON AND STEEL SCRAP

... International scrap cartel buys an additional 250,000 tons at substantially higher prices.

• • •

... Domestic market weak; composite down 42c.

SEPT. 8.—Following the visit of the head of the European Steel Scrap Federation to New York last week, it was learned that that cartel had committed itself for an additional 250,000 tons of material at prices above those paid on the last large sale in June, when the domestic market was considerably lower than now. The move came at a time when the domestic market was sagging as a result of the almost complete absence of any large mill sales, the holding up of shipments on the part of some consumers, and the weakness exhibited in recent railroad lists.

At Pittsburgh, the Pennsylvania's list brought about \$1 a ton less than in early August, and at Buffalo a small tonnage of railroad steel sold off. No. 1 heavy melting steel declined 75c. at Chicago and 50c. at Pittsburgh, being unchanged at Philadelphia in the absence of any real test. As a result THE IRON AGE composite figure is down 42c. to \$19.75.

Pittsburgh

The market is unquestionably down this week from the previous period. Although sales into mill consumption are lacking, the railroad lists which closed last week exerted an adverse influence. Failing to bring prices as high as a month ago. Steel on the Pennsylvania list brought about \$22 a ton or \$1 less than at the start of August.

Chicago

Brokers' bids have been reduced to \$18, delivered, for No. 1 steel as a result of a lack of mill interest, hold-orders on some of the material already on the books, and a sizable increase in the amount of scrap moving into this market. One mill has suspended shipments temporarily, while another has been holding up cars at irregular intervals for several weeks. At the present operating rates, mills are consuming large tonnages of scrap, and, since there is no reason for much of a change in operations for the remainder of this month at least, the rate of consumption should remain fairly steady.

Cleveland

Shipments are being held up in the Youngstown district and there is an absence of new consumer demand. These factors are having a depressing effect on the market, causing a further weakness and decline of 50c. a ton on several steel-making grades on which quotations today, however, are nominal. Brokers are buying some No. 1 heavy melting steel for a Cleveland consumer and with this activity the recent local price on this grade is being maintained. The weakness of the market is indicated by prices offered during the week for some of the railroad scrap. For No. 1 heavy melting steel \$21, delivered Buffalo, was offered by brokers, but the railroad sold only a small lot, decided to hold the remainder for a better price. Cast iron car wheels are down 50c. a ton based on a railroad sale here at \$18.75 a net ton.

Buffalo

The leading consumer of steel grades here is offering \$19.50 to \$20 for No. 1 heavy melting and \$1.50 below those figures for No. 2. The market is quiet, but despite declines in prices brokers are fairly hopeful that renewed strength will become apparent within the next few weeks.

Boston

For domestic delivery there was not enough business transacted the past week to establish a market. The export market, however, continued active with prices holding, despite the softness of the Pittsburgh market. Customs House figures for the first six months of 1937 show total exports of 126,832 tons, of which 61,829 tons went to Japan. Massachusetts scrap dealers are advertising in their local newspapers for automobile scrap and cast iron, for which they offer \$10 to \$13 a ton, f.o.b. their yards. The Quartermaster Department, Army base, will close bids Friday, Sept. 10, on about 1720 tons of scrap.

New York

Through I. S. L. Elliott, head of the European Steel Scrap Federation, who visited New York on a hurried trip last week, the international cartel committed itself for an additional 250,000 tons of scrap at prices higher than those paid on the last purchase made in June when the domestic market was

several dollars lower. Because of the complicated international political situation abroad and the current effort being made informally to restrict scrap exports, the move came as somewhat of a surprise. In fact, several brokers had expressed a desire to await the appearance of more definite trends abroad before taking action. Meanwhile, the domestic market is flat in the absence of any mill sales in the past 10 days. Principal grades are off 50c., the average buying price for No. 1 steel being \$16. For obvious reasons, prices for materials for export are much firmer.

Cincinnati

Mills continue to be aloof from the scrap market, forcing the undertone softer. Buyers are loath to close for material at present prices and bids have been reduced further on important items. Yard supplies are in good shape and dealers are taking material in anticipation of early fall demand.

St. Louis

The edge has been taken off the scrap market at St. Louis, due to weakness in other markets plus increased offerings by the railroads and country shippers. The St. Louis-Southwestern Railway sold 1700 tons, most of it to St. Louis interests. The Louisville & Nashville list of 5600 tons is pending, and it is expected that some of it will reach this market.

Detroit

A weaker sentiment in the Detroit scrap market has manifested itself in the last week. Activity has been at an extremely low ebb, with production from automobile plants now at the lowest point of the year and mill interest dull. A few of the small offerings that have been made have in some cases brought relatively high prices, the seeming contradiction arising from the fact that not much scrap is available in this locality at the present time. The entire picture locally is expected to change by the middle of the month.

Philadelphia

Sentiment in this territory continues to be uncertain in general, but definitely weaker in certain instances. Blast furnace grades, some specialties and No. 2 heavy melting steel are all at least 50c. lower, albeit untested to some extent, but the important No. 1 steel quotation insists on holding moderately steady. Although the No. 1 price level has had no serious price test over the past month, there is still sizable quantities being shipped to all district consumers on old orders, and brokers are finding it necessary to pay between \$19 and \$19.50 to draw out material. On the other hand, the inbound tonnage of No. 2 for processing is quite heavy, whereas mill demand for this grade is at the moment negligible, the result being a sag in price and a wider differential between the two heavy melting grades. The 3000 tons of bundles on Budd's September list went to a nearby mill at approximately \$18.50 f.o.b., the delivery price being in line with quoted levels.

Iron and Steel Scrap Prices

PITTSBURGH

Per gross ton delivered to consumer:
No. 1 hvy. mitng. steel. \$21.00 to \$21.50
Railroad hvy. mitng. 22.00 to 22.50
No. 2 hvy. mitng. steel. 18.50 to 19.00
No. 2 RR. wrought. 21.00 to 21.50
Scrap rails. 23.00 to 23.50
Rails 3 ft. and under. 25.00 to 25.50
Comp. sheet steel. 21.00 to 21.50
Hand bundled sheets. 19.00 to 19.50
Hvy. steel axle turn. 19.00 to 19.50
Machine shop turn. 15.50 to 16.00
Short shov. turn. 15.50 to 16.00
Mixed bor. & turn. 15.50 to 16.00
Cast iron borings. 15.50 to 16.00
Cast iron carwheels. 20.50 to 21.00
Hvy. breakable cast. 17.50 to 18.00
No. 1 cupola cast. 20.00 to 20.50
RR. knuckles & cplrs. 26.00 to 26.50
Rail coil & leaf springs. 26.00 to 26.50
Rolled steel wheels. 26.00 to 26.50
Low phos. billet crops. 26.00 to 26.50
Low phos. sh. bar. 25.50 to 26.00
Low phos. punchings. 24.00 to 24.50
Low phos. plate, hvy. 25.00 to 25.50
Low phos. plate clips. 24.00 to 24.50
Steel car axles. 26.00 to 26.50

PHILADELPHIA

Per gross ton delivered to consumer:
No. 1 hvy. mitng. steel. \$19.50 to \$20.00
No. 2 hvy. mitng. steel. 17.50
Hydraulic bund. new. 19.00 to 19.50
Hydraulic bund. old. 14.50 to 15.00
Steel rails for rolling. 23.00 to 23.50
Cast iron carwheels. 20.50 to 21.00
Hvy. breakable cast. 19.00 to 19.50
No. 1 cast. 20.50 to 21.00
Stove plate (steel wks.) 16.00 to 16.50
Railroad malleable. 20.00 to 21.00
Machine shop turn. 13.50 to 14.00
No. 1 blast furnace. 12.50 to 13.00
Cast borings. 13.50 to 14.00
Heavy axle turnings. 16.00 to 16.50
No. 1 low phos. hvy. 24.50 to 25.00
Couplers & knuckles. 25.50 to 26.00
Rolled steel wheels. 25.50 to 26.00
Steel axles. 29.00 to 29.50
Shafting. 24.00 to 24.50
No. 1 RR. wrought. 20.50 to 21.00
Spec. iron & steel pipe. 16.50 to 17.00
No. 1 forge fire. 16.50 to 17.00
Cast borings (chem.). 14.50 to 15.00

CHICAGO

Delivered to Chicago district consumers:
Per Gross Ton
Hvy. mitng. steel. \$18.00 to \$18.50
Auto. hvy. mitng. steel, alloy free. 16.50 to 17.00
No. 2 auto. steel. 14.50 to 15.50
Shoveling steel. 18.00 to 18.50
Hydraul. comp. sheets. 17.00 to 17.50
Drop forge flashings. 15.00 to 15.50
No. 1 busheling. 17.00 to 17.50
Rolled carwheels. 22.00 to 22.50
Railroad tires, cut. 21.50 to 22.00
Railroad leaf springs. 21.50 to 22.00
Steel coup. & knuckles. 21.00 to 21.50
Axle turnings. 17.00 to 17.50
Coil springs. 23.00 to 23.50
Axle turn. (elec.). 18.00 to 18.50
Low phos. punchings. 21.50 to 22.00
Low phos. plates, 12 in. and under. 21.00 to 21.50
Cast iron borings. 11.00 to 11.50
Short shov. turnings. 11.50 to 12.00
Machine shop turn. 9.50 to 10.00
Rerolling rails. 21.00 to 21.50
Steel rails under 3 ft. 21.00 to 21.50
Steel rails under 2 ft. 21.50 to 22.00
Angie bars, steel. 21.00 to 21.50
Cast iron carwheels. 19.00 to 19.50
Railroad malleable. 19.00 to 19.50
Agric. malleable. 16.00 to 16.50

Per Net Ton
Iron car axles. \$25.50 to \$26.00
Steel car axles. 25.50 to 26.00
No. 1 RR. wrought. 15.50 to 16.00
No. 2 RR. wrought. 16.00 to 16.50
No. 2 busheling, old. 8.50 to 9.00
Locomotive tires. 18.50 to 19.00
Pipes and flues. 13.00 to 13.50
No. 1 machinery cast. 14.50 to 15.00
Clean auto. cast. 14.50 to 15.00
No. 1 railroad cast. 14.00 to 14.50
No. 1 agric. cast. 13.00 to 13.50
Stove plate. 11.50 to 12.00
Grate bars. 12.00 to 12.50
Brake shoes. 12.00 to 12.50

YOUNGSTOWN

Per gross ton delivered to consumer:
No. 1 hvy. mitng. steel. \$20.50 to \$21.00
Hydraulic bundles. 19.50 to 20.00
Machine shop turn. 15.00 to 15.50

CLEVELAND

Per gross ton delivered to consumer:
No. 1 hvy. mitng. steel. \$19.50 to \$20.00
No. 2 hvy. mitng. steel. 18.00 to 18.50
Comp. sheet steel. 18.50 to 19.00
Light bund. stampings. 15.00 to 15.50
Drop forge flashings. 17.50 to 18.00
Machine shop turn. 12.50 to 13.00
Short shov. turn. 12.50 to 13.00
No. 1 busheling. 18.00 to 18.50
Steel axle turnings. 15.00 to 15.50
Low phos. billet crops. 25.50 to 26.00
Cast iron borings. 14.00 to 14.50
Mixed bor. & turn. 14.00 to 14.50
No. 2 busheling. 13.00 to 13.50
Railroad grate bars. 11.50 to 12.00
Stove plate. 11.00 to 11.50
Rails under 3 ft. 24.00 to 24.50
Rails for rolling. 21.00 to 21.50
Railroad malleable. 22.00 to 22.50
Cast iron carwheels. 21.00 to 21.50

BIRMINGHAM

Per gross ton delivered to consumer:
Hvy. melting steel. \$16.00 to \$16.50
Scrap steel rails. 17.00
Short shov. turnings. 9.00 to 10.00
Stove plate. 10.00
Steel axles. 18.00 to 19.00
Iron axles. 18.50 to 19.00
No. 1 RR. wrought. 18.00 to 18.50
Rails for rolling. 20.00 to 20.50
No. 1 cast. 18.00 to 18.50
Tramcar wheels. 18.00 to 18.00

DETROIT

Dealers' buying prices per gross ton:
No. 1 hvy. mitng. steel. \$16.50 to \$17.00
No. 2 hvy. mitng. steel. 15.50 to 16.00
Borings and turnings. 12.50 to 13.00
Long turnings. 12.00 to 12.50
Short shov. turnings. 14.00 to 14.50
No. 1 machinery cast. 16.00 to 16.50
Automotive cast. 16.75 to 17.25
Hvy. breakable cast. 14.50 to 15.00
Hydraul. comp. sheets. 18.50 to 19.00
Stove plate. 10.50 to 11.00
New factory bushel. 17.00 to 17.50
Old No. 2 busheling. 11.50 to 12.00
No. 2 busheling (black fender stock). 14.00 to 14.50
Sheet clippings. 13.50 to 14.00
Flashings. 16.25 to 16.75
Low phos. plate scrap. 18.50 to 19.00

NEW YORK

Dealers' buying prices per gross ton:
No. 1 hvy. mitng. steel. \$15.50 to \$16.50
No. 2 hvy. mitng. steel. 14.00 to 15.00
Hvy. breakable cast. 14.75 to 15.00
No. 1 machinery cast. 15.50 to 16.00
No. 2 cast. 14.50 to 15.00
Stove plate. 12.00 to 12.50
Steel car axles. 27.00 to 27.50
Shafting. 19.50 to 20.00
No. 1 RR. wrought. 17.00 to 17.50
No. 1 wrought long. 16.50 to 17.00
Spec. iron & steel pipe. 13.00 to 13.50
Rails for rolling. 19.00 to 19.50
Clean steel turnings. 9.50 to 10.00
Cast borings. 9.00 to 9.50
No. 1 blast furnace. 9.00 to 9.50
Cast borings (chem.). 12.50 to 13.00
Unprep. yard scrap. 10.50 to 11.50
Per gross ton, delivered local foundries:
No. 1 machn. cast. \$17.50 to \$18.50
No. 1 hvy. cast cupola. 14.50 to 15.00
No. 2 cast. 14.00 to 14.50

BOSTON

Dealers' buying prices per gross ton:
No. 1 hvy. mitng. steel. \$15.80 to \$16.30
Scrap rails. 16.00 to 16.50
No. 2 steel. 14.80 to 15.30
Breakable cast. 15.00 to 15.10
Machine shop turn. 9.80 to 10.00
Mixed bor. & turn. 9.80 to 10.50
Bund. skeleton long. 13.25 to 13.30
Shafting. 19.00 to 19.50
Cast bor. chemical. 9.00 to 10.00
Per gross ton delivered consumers' yards:
Textile cast. \$18.00 to \$19.00
No. 1 machine cast. 18.00 to 19.00

CANADA

Dealers' buying prices at their yards:
per gross ton
Toronto Montreal
No. 1 hvy. mitng. stl. \$14.50
No. 2 hvy. mitng. stl. 13.50
Mixed dealers steel. 12.50
Scrap pipe. 11.75
Steel turnings. 9.75
Cast borings. 11.00
Machinery cast. 18.00
Dealers cast. 16.00
Stove plate. 13.00

EXPORT

Dealers' buying prices per gross ton:
New York, truck lots, delivered, barrels.
No. 1 hvy. mitng. steel. \$16.50 to \$17.00
No. 2 hvy. mitng. steel. 15.50 to 16.00
No. 2 cast. 14.50 to 15.00
Stove plate. 12.50 to 13.00
Boston on cars at Army Base or Mystic Wharf
No. 1 hvy. mitng. steel. \$18.25 to \$18.50
No. 2 hvy. mitng. steel. 17.25 to 17.50
Rails (scrap). 18.00
Philadelphia, delivered alongside boats, Port Richmond
No market at present.

PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham. Prices at Du'uth are \$2 a ton higher, and delivered Detroit \$3 higher.

Per Gross Ton

Rerolling \$37.00
Forging quality 43.00

Sheet Bars

F.o.b. Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Per Gross Ton

Open-hearth or Bessemer \$37.00

Skelp

F.o.b. Pittsburgh, Chicago, Youngstown, Buffalo, Coatesville, Pa., Sparrows Point, Md.

Per Lb.

Grooved, universal and sheared 2.10c.

Wire Rods (No. 5 to 9/32 in.)

Per Gross Ton

F.o.b. Pittsburgh or Cleveland. \$47.00
F.o.b. Chicago, Youngstown or Anderson, Ind. 48.00
F.o.b. Worcester, Mass. 49.00
F.o.b. Birmingham 50.00
F.o.b. San Francisco 56.00
F.o.b. Galveston 53.00
Rods over 9/32 in. to 47/64 in., inclusive, \$5 a ton over base.

BARS, PLATES, SHAPES

Iron and Steel Bars

Soft Steel

Base per Lb.

F.o.b. Pittsburgh 2.45c.
F.o.b. Chicago or Gary 2.50c.
F.o.b. Duluth 2.60c.
Del'd Detroit 2.60c.
F.o.b. Cleveland 2.50c.
F.o.b. Buffalo 2.55c.
Del'd Philadelphia 2.74c.
Del'd New York 2.78c.
F.o.b. Birmingham 2.60c.
F.o.b. cars dock Gulf ports 2.85c.
F.o.b. cars Pacific Ports 3.00c.

Rail Steel

(For merchant trade)

F.o.b. Pittsburgh 2.30c.
F.o.b. Cleveland, Chicago, Gary or Moline, Ill. 2.35c.
F.o.b. Buffalo 2.40c.
F.o.b. Birmingham 2.45c.
F.o.b. cars dock Gulf ports 2.70c.
F.o.b. cars dock Pacific ports 2.85c.

*Billet Steel Reinforcing
(Straight lengths as quoted by
distributors)*

F.o.b. Pittsburgh 2.55c.
F.o.b. Buffalo, Cleveland, Youngstown, Ch/cago, Gary or Birmingham 2.80c.
Del'd Detroit 2.70c.
F.o.b. cars dock Gulf ports 2.95c.
F.o.b. cars dock Pacific ports 2.95c.

*Rail Steel Reinforcing
(Straight lengths as quoted by
distributors)*

F.o.b. Pittsburgh 2.40c.
F.o.b. Buffalo, Cleveland, Youngstown, Ch/cago, Gary or Birmingham 2.45c.
F.o.b. cars dock Gulf ports 2.80c.
F.o.b. cars dock Pacific ports 2.80c.

Iron

F.o.b. Chicago 2.40c.
F.o.b. Pittsburgh (refined) 3.60c.

*Cold Finished Bars and Shafting**

Base per Lb.

F.o.b. Pittsburgh 2.90c.
F.o.b. Cleveland, Chicago and Gary 2.95c.
F.o.b. Buffalo 3.00c.
F.o.b. Detroit 2.95c.

* In quantities of 10,000 to 10,000 lb.

Plates

Base per Lb.

F.o.b. Pittsburgh 2.25c.
F.o.b. Chicago or Gary 2.30c.
Del'd Cleveland 2.435c.
F.o.b. Coatesville or Spar. Pt. 2.35c.
Del'd Philadelphia 2.435c.
Del'd New York 2.53c.
F.o.b. Birmingham 2.40c.

F.o.b. cars dock Gulf ports 2.65c.
F.o.b. cars dock Pacific ports 2.80c.
Wrought iron plates, f.o.b. Pittsburgh 3.30c.

Floor Plates

F.o.b. Pittsburgh 3.50c.
F.o.b. Chicago 3.55c.
F.o.b. Coatesville 3.60c.

F.o.b. cars dock Gulf ports 3.90c.
F.o.b. cars dock Pacific ports 4.05c.

Structural Shapes

Base per Lb.
F.o.b. Pittsburgh 2.25c.
F.o.b. Chicago 2.30c.

Del'd Cleveland 2.435c.
F.o.b. Buffalo or Bethlehem 2.35c.

Del'd Philadelphia 2.455c.
Del'd New York 2.5025c.

F.o.b. Birmingham (standard) 2.40c.
F.o.b. cars dock Gulf ports 2.65c.
F.o.b. cars dock Pacific ports 2.80c.

Steel Sheet Piling

Base per Lb.
F.o.b. Pittsburgh 2.60c.

F.o.b. Chicago or Buffalo 2.70c.
F.o.b. cars dock Gulf or Pacific Coast ports 3.05c.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., per gross ton \$42.50
Angle bars, per 100 lb. 2.80

F.o.b. Basing Points

Light rails (from billets) per gross ton \$43.00

Light rails (from rail steel) per gross ton 42.00

Base per Lb.

Spikes 3.15c.
Tie plates, steel 2.30c.
Tie plates, Pacific Coast ports 2.40c.
Track bolts, to steam railroads, 4.35c.
Track bolts, to jobbers, all sizes (per 100 counts) 65-5 per cent off list

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa., Buffalo; on spikes alone, Youngstown, Lebanon, Pa., Richmond, Va.

SHEETS, STRIP, TIN PLATE

TERNE PLATE

Sheets

Hot Rolled

Base per Lb.
No. 10, f.o.b. Pittsburgh 2.40c.
No. 10, f.o.b. Gary 2.50c.
No. 10, del'd Detroit 2.60c.
No. 10, del'd Philadelphia 2.69c.
No. 10, f.o.b. Granite City 2.60c.
No. 10, f.o.b. Birmingham 2.55c.
No. 10, f.o.b. cars dock Pacific ports 2.95c.
No. 10, wrought iron, Pghn. 4.25c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh 3.15c.
No. 24, f.o.b. Gary 3.25c.
No. 24, del'd Detroit 3.35c.
No. 24, del'd Philadelphia 3.44c.
No. 24, f.o.b. Granite City 3.25c.
No. 24, f.o.b. Birmingham 3.30c.
No. 24, f.o.b. cars dock Pacific ports 3.80c.
No. 24, wrought iron, Pitts-burgh 5.15c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh 3.10c.
No. 10 gage, f.o.b. Gary 3.20c.
No. 10 gage, f.o.b. Detroit 3.30c.
No. 10 gage, del'd Philadelphia 3.39c.
No. 10, f.o.b. Granite City 3.30c.
No. 10 gage, f.o.b. Birmingham 3.25c.
No. 10 gage, f.o.b. cars dock Pacific ports 3.70c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh 3.55c.
No. 20 gage, f.o.b. Gary 3.65c.
No. 20 gage, del'd Detroit 3.75c.
No. 20 gage, del'd Philadelphia 3.84c.
No. 20, f.o.b. Granite City 3.75c.
No. 20 gage, f.o.b. Birmingham 3.70c.
No. 20 gage, f.o.b. cars, dock, Pacific ports 4.10c.

Galvanized Sheets

No. 24 gage, f.o.b. Pittsburgh 3.80c.
No. 24, f.o.b. Gary 3.90c.

No. 24, del'd Philadelphia 4.09c.

No. 24, f.o.b. Granite City 4.00c.

No. 24, f.o.b. Birmingham 3.96c.
No. 24, f.o.b. cars, dock, Pacific ports 4.40c.
No. 24, wrought iron, Pitts-burgh 6.10c.

Electrical Sheets (F.o.b. Pittsburgh)

Base per Lb.

Field grade 3.25c.
Armature 3.70c.
Electrical 4.20c.
Special Motor 5.10c.
Special Dynamo 5.80c.
Transformer 6.30c.
Transformer Special 7.30c.
Transformer Extra Special 7.80c.

Base gage changed from 28 to 24 gage. Gage extras are the same as those applying on hot-rolled, annealed sheets with few exceptions.

Silicon Strip in coils—Sheet price plus silicon sheet extra width extra plus 2¢ per 100 lb. for coils.

Long Ternes

No. 24, unassorted 8-lb. coating
f.o.b. Pittsburgh 4.10c.
F.o.b. Gary 4.20c.
F.o.b. cars, dock, Pacific ports 4.80c.

Vitreous Enameling Stock

No. 20, f.o.b. Pittsburgh 3.50c.
No. 20, f.o.b. Gary 3.60c.
No. 20, f.o.b. Granite City 3.70c.
No. 20, f.o.b. cars dock Pacific ports 4.10c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh, per lb. 3.30c.
No. 28, Gary 3.40c.
No. 28, f.o.b. Granite City 3.50c.
No. 28, cars dock Pacific ports, boxed 4.175c.

Tin Plate

Base per Box
Standard cokes, f.o.b. Pittsburgh district mill \$5.35
Standard cokes, f.o.b. Gary 5.45
Standard coke, f.o.b. Granite City 5.55

Above quotations practically the equivalent of previous quotations owing to new method of quoting, effective Jan. 1, 1937.

** Customary 7½ per cent discount in effect through 1936 discontinued as of Jan. 1, 1937.*

Roofing Terne Plate

(F.o.b. Pittsburgh)

(Per Package, 112 sheets, 20 x 28 in.)
8-lb. coating I.C. \$12.00
15-lb. coating I.C. 14.00
20-lb. coating I.C. 15.00
25-lb. coating I.C. 16.00
30-lb. coating I.C. 17.25
40-lb. coating I.C. 19.50

Hot-Holed Hoops, Bands, Strip and Flats under ¼ in.

Base per Lb.
All widths up to 24 in., Pitts-burgh 2.40c.
All widths up to 24 in., Chicago 2.50c.
All widths up to 24 in., del'd Detroit 2.60c.
All widths up to 24 in., Granite City 2.60c.
All widths up to 24 in., 2.60c.
Birmingham 2.55c.
Cooperage stock, Pittsburgh 2.50c.
Cooperage stock, Chicago 2.60c.

** Carbon 0.25 and less.*

Cold Rolled Spring Steel

Pittsburgh and

Cleveland Worcester

Carbon 0.25-0.50%	3.20c.	3.40c.
Carbon .51-.75	4.45c.	4.65c.
Carbon .76-1.00	6.30c.	6.50c.
Carbon Over 1.00	8.50c.	8.70c.

Fender Stock

No. 14, Pittsburgh or Cleveland 3.45c.

No. 20, Pittsburgh or Cleveland 3.85c.

WIRE PRODUCTS
 (Carload lots, f.o.b. Pittsburgh and Cleveland)
To Manufacturing Trade

Per Lb.	
Bright wire	2.90c.
Galvanized wire	2.95c.
Spring wire	3.50c.
Chicago prices on products sold to the manufacturing trade are \$1 a ton above Pittsburgh or Cleveland. Worcester and Duluth prices are \$2 a ton above, Birmingham \$3 above, and Pacific Coast prices \$3 a ton above Pittsburgh or Cleveland.	

To the Trade

Base per Keg	
Standard wire nails	\$2.75
Smooth coated nails	\$2.75
Cut nails, carloads	\$3.50

Base per 100 Lb.

Annealed fence wire	\$2.20
Galvanized fence wire	3.60
Polished staples	3.45
Galvanized staples	3.70
Barbed wire, galvanized	3.40
Twisted barbless wire	3.40
Woven wire fence, base column	74
Single loop base ties, base col.	63
Chicago and Anderson, Ind., mill prices are \$1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is \$2 above Pittsburgh); Duluth, Minn., mill prices are \$2 a ton over Pittsburgh, except for woven wire fence, which is \$3 over Pittsburgh and Birmingham mill prices are \$3 a ton over Pittsburgh.	

On wire nails, barbed wire and staples, prices at Houston, Galveston and Corpus Christi, Tex., New Orleans, Lake Charles, La., and Mobile, Ala., are \$6 a ton over Pittsburgh.

On nails, staples and barbed wire, prices of \$6 a ton over Pittsburgh are also quoted at Beaumont and Orange, Tex.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

Steel	Wrought Iron
In. Black Galv.	In. Black Galv.
1/4 ... .52	31
1/4 to % .55	38 1/2
1/2 ... .59 1/2	49
%62 1/2	53
1 to 3 ... .64 1/2	55 1/2

Lap Weld

2 ... .57	47 1/2
2 1/2 & 3 ... .60	50 1/2
3 1/2 to 6 ... .62	52 1/2
7 & 8 ... .61	50 1/2
9 & 10 ... .60 1/2	50
11 & 12 ... .59 1/2	49

Butt Weld, extra strong, plain ends

1/4 ... .50 1/2	36 1/2
1/4 to %52 1/2	40 1/2
1/2 ... .57 1/2	48 1/2
%61 1/2	52 1/2
1 to 3 ... .63	55

Lap Weld, extra strong, plain ends

2 ... .55	46 1/2
2 1/2 & 3 ... .59	50 1/2
3 1/2 to 6 ... .62 1/2	54
7 & 8 ... .61 1/2	51
9 & 10 ... .60 1/2	50
11 & 12 ... .59 1/2	49

On butt-weld and lap-weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2 1/2 points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Seamless Steel Commercial Boiler Tubes and Locomotive Tubes
 (Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

	Cold	Hot
1 in. o.d.	12 B.W.G.	\$ 9.46
1 1/4 in. o.d.	12 R.W.G.	11.21
1 1/2 in. o.d.	12 R.W.G.	12.38
1 3/4 in. o.d.	12 B.W.G.	14.09
2 in. o.d.	12 B.W.G.	15.78
2 1/4 in. o.d.	12 B.W.G.	17.60
2 1/2 in. o.d.	12 B.W.G.	19.37
2 3/4 in. o.d.	12 B.W.G.	21.22
2 1/2 in. o.d.	12 B.W.G.	22.49
3 in. o.d.	12 B.W.G.	23.60
3 1/2 in. o.d.	11 B.W.G.	29.79
4 in. o.d.	10 B.W.G.	38.96
5 in. o.d.	9 B.W.G.	56.71
6 in. o.d.	7 B.W.G.	87.07

Extra for less-carload quantities:

25,000 lb. or ft. to 30,000 lb. or ft.	5%
12,000 lb. or ft. to 24,000 lb. or ft.	12 1/2%
6,000 lb. or ft. to 11,000 lb. or ft.	25%
2,000 lb. or ft. to 5,000 lb. or ft.	50%
Under 2,000 lb. or ft.	50%

CAST IRON WATER PIPE

	Per Net Ton
*6-in. and larger, del'd Chicago	\$55.00
6-in. and larger, del'd New York	53.00
*6-in. and larger, Birmingham	47.00
6-in. and larger, f.o.b. dock, San Francisco or Los Angeles	56.00
F.o.b. dock, Seattle	56.00
4-in. f.o.b. dock, San Francisco or Los Angeles	59.00
F.o.b. dock, Seattle	59.00
Class "A" and gas pipe, \$3 extra.	
4-in. pipe is \$3 a ton above 6-in.	
Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is \$46, Birmingham, and \$54 delivered Chicago; and 4-in. pipe, \$49, Birmingham, and \$58 delivered Chicago.	

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
Machine and carriage bolts:	
1/4 in. x 6 in. and smaller	.65 and 5*
Larger and longer up to	
1 in.	.60 and 10*
1 1/4 in. and larger	.60 and 10*
Lag bolts	.60 and 10*
Plow bolts, Nos. 1, 2, 3	
and 7	.65 and 5
Hot pressed nuts, and c.p.c. and t nuts, square or hex.	
blank or tapped:	
1/2 in. and smaller	.65
9/16 in. to 1 in. inclusive	.60 and 5
1 1/4 in. and larger	.60
Stove bolts in packages, nuts attached	.70
Stove bolts in packages, with nuts separate	.70 and 10
Stove bolts in bulk	.80

	Semi-finished hexagon nuts, U.S.S. and S.A.E.:
1/4 in. and smaller	.60 and 10
9/16 in. to 1 in. inclusive	.60 and 5
1 1/4 in. and larger	.60
Stove bolts in packages, nuts attached	.70
Stove bolts in packages, with nuts separate	.70 and 10
Stove bolts in bulk	.80

On stove bolts freight is allowed to destination on 200 lb. and over.

Large Rivets

(1 1/2-in. and larger)

Base per 100 Lb.
 F.o.b. Pittsburgh or Cleveland \$3.60
 F.o.b. Chicago or Birmingham 3.70

Small Rivets

(7/16-in. and smaller)

Per Cent Off List
 F.o.b. Pittsburgh 65 and 5
 F.o.b. Cleveland 65 and 5
 F.o.b. Chicago and Birmingham 65 and 5

	Cap and Set Screws
(Freight allowed up to but not exceeding 65c. per 100 lb. on lots of 200 lb. or more.)	
Milled cap screws, 1 in. dia. and smaller	.50 and 10
Milled standard set screws, case hardened, 1 in. dia. and smaller	.75
Milled headless set screws, cut thread 3/4 in. and smaller	.75
Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller	.60
Upset set screws, cup and oval points	.75
Milled studs	.65

Alloy and Stainless Steel

Alloy Steel Blooms, Billets and Slabs

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem. Base price, \$60 a gross ton.

Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton. Open-hearth grade, base 3.00c.

Delivered, Detroit 3.15c.

S.A.E. Alloy Series Differential Numbers per 100 lb.

200 (% Nickel) 30.25

2100 (1 1/2 % Nickel) 0.75

2300 (3 1/2 % Nickel) 1.85

2500 (5% nickel)	\$2.25
3100 Nickel-chromium	0.70
3200 Nickel-chromium	1.35
3300 Nickel-chromium	3.80
3400 Nickel-chromium	3.20
4100 Chromium-molybdenum (0.18 to 0.25 Molybdenum)	0.55
4100 Chromium-molybdenum (0.25 to 0.40 Molybdenum)	0.75
4600 Nickel - molybdenum (0.20 to 0.30 Mo, 1.50 to 2.00 Ni)	1.10
5100 Chrome steel (0.60-0.90 Cr.)	0.35
5100 Chrome steel (0.80-1.10 Cr.)	0.45
5100 Chromium spring steel	0.15
6100 Chromium-vanadium	1.20
6100 Chromium-vanadium spring steel	0.85
Chromium-nickel-vanadium	1.50
Carbon-vanadium	0.85

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 20c. higher. Slabs with a section area of 16 in. and 2 1/2 in. thick or over take the billet base.

Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.60c. base per lb. Delivered Detroit, 3.75c. carlots.

CORROSION & HEAT RESISTANT ALLOYS

(Base prices, cents per lb., f.o.b. Pittsburgh)

Chrome-Nickel

No. 304	No. 302
Forging billets	21.25c.
Bars	25c.
Plates	29c.
Structural shapes	25c.
Sheets	36c.
Hot-rolled strip	23.50c.
Cold-rolled strip	30c.
Drawn wire	25c.

Straight Chrome

No.	No.	No.	No.
410	430	442	446
Bars	18.50c.	19c.	22.50c.
Plates	21.50c.	22c.	25.50c.
Sheets	26.50c.	29c.	32.50c.
Hot strip	17c.	17.50c.	23c.
Cold stp.	22c.	22.50c.	28.50c.

TOOL STEEL

High speed	67c.
High-carbon-chrome	43c.
Oil-hardening	24c.
Special	22c.
Extra	18c.
Regular	14c.
Prices for warehouse distribution to all points on or East of Mississippi River are 2c. higher. West of Mississippi quotations are 2c. a lb. higher.	

British and Continental

BRITISH

Per Gross Ton, f.o.b. United Kingdom Ports

Ferrromanganese, ex-port	£20 Nominal
Tin plate, per base box 25s. to 25s. 6d.	
Steel bars, open-hearth	£11 2s. 6d.
Beams, open-hearth	£11 2s. 6d.
Channels, open-hearth	£11 7s. 6d.
Angles, open-hearth	£11 2s. 6d.
Black sheets, No. 24 gage	£15

IRON AND STEEL WAREHOUSE PRICES

PITTSBURGH*

	<i>Per Net Ton</i>
Plates	3.70c.
Structural shapes	3.70c.
Soft-steel bars and small shapes	3.80c.
Reinforcing steel bars	3.80c.
Cold-finished and screw stock:	
Rounds and hexagons	4.15c.
Squares and flats	4.15c.
Hot rolled strip incl. 3/16 in. thick, under 24 in. wide	4.00c.
Hoops	4.50c.
Hot-rolled annealed sheets (No. 24), 10 or more bundles	4.50c.
Galv. sheets (No. 24), 10 or more bundles	5.15c.
Hot-rolled sheets (No. 10)	3.75c.
Galv. corrug. sheets (No. 28), per square (more than 3750 lb.)	\$4.48
Spikes, large	1 to 24 kegs 3.90c.
	<i>Per Cent Off List</i>
Track bolts, all sizes per 100 count	55
Machine bolts, 100 count	**
Carriage bolts, 100 count	**
Nuts, all styles, 100 count	**
Large rivets, base per 100 lb.	\$4.35
Wire, black, soft ann'd, base per 100 lb.	3.45c.
Wire, galv. soft, base per 100 lb.	3.85c.
Common wire nails, per keg.	3.00c.
Cement coated nails, per keg.	3.00c.

On plates, structural, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 3999 lb.

* Delivered in Pittsburgh switching district.

** Prices on application.

CHICAGO Base per Lb.

Plates and structural shapes	3.75c.
Soft steel bars, rounds	3.85c.
Soft steel bars, squares and hexagons	4.00c.
Cold-fin. steel bars:	
Rounds and hexagons	4.30c.
Flats and squares	4.30c.
Hot-rolled strip	4.10c.
Hot-rolled annealed sheets (No. 24)	4.60c.
Galv. sheets (No. 24)	5.25c.
Spikes (keg lots)	4.40c.
Track bolts (keg lots)	5.80c.
Rivets, structural (keg lots)	4.60c.
Rivets, boiler (keg lots)	4.70c.
	<i>Per Cent Off List</i>
Machine bolts	*60
Carriage bolts	*60
Lag screws	**55 and 5
Hot-pressed nuts, sq. tap or blank	*60
Hot-pressed nuts, hex. tap or blank	*60
Hex. head cap screws	60
Cut point set screws	75
Flat head bright wood screws	62 and 20
Spring cotters	45
Stove bolts in full packages	72½
Rd. hd. tank rivets, 7/16 in. and smaller	55
Wrought washers	\$4.00 off list
Black ann'd wire per 100 lb. to mfg. trade (No. 14 and heavier)	\$4.55
Com. wire nails, 15 kegs or more, per keg	\$3.20
Cement c't'd nails, 15 kegs or more, per keg	\$3.20

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 3999 lb. All prices are f.o.b. consumers' plants within the Chicago switching district.

* These are quotations delivered to city trade for quantities of 100 lb. or more. For lots of less than 100 lb., the quotation is 60 per cent off. Discounts applying to country trade are 70 per cent off, f.o.b. Chicago, with full or partial freight allowed up to 50c. per 100 lb.

NEW YORK

	<i>Base per Lb.</i>
Plates, 1/4 in. and heavier	4.00c.
Structural shapes	3.97c.
Soft steel bars, round	4.12c.
Iron bars, Swed. char-coal	7.00 to 7.25c.
Cold-fin. shafting and screw stock:	
Rounds and hexagons	4.57c.
Flats and squares	4.57c.
Cold-rolled; strip, soft and quarter hard	3.92c.
Hoops	4.32c.

Bands	4.82c.
Hot-rolled sheets (No. 10)	4.00 to 4.07c.
Hot-rolled ann'd sheets (No. 24*)	4.50 to 4.82c.
Galvanized sheets (No. 24*)	4.50 to 5.47c.
Long terne sheets (No. 24)	5.50 to 6.20c.
Armclo iron, galv. (No. 24†)	6.25c.
Toncan iron, galv. (No. 24†)	6.25c.
Galvanneal (No. 24†)	6.60c.
Armclo iron, hot-rolled annealed (No. 24†)	5.65c.
Toncan iron, hot-rolled annealed (No. 24†)	5.65c.
Armclo iron hot-rolled (No. 10†)	4.60c.
Toncan iron, hot-rolled (No. 10†)	4.60c.
Cold-rolled sheets (No. 20) for quantities 400 to 1499 lb.	

Standard quality	5.40c.
Deep drawing	6.05c.
Stretcher leveled	6.05c.
SAE 2300, hot-rolled	7.82c.
SAE 3100, hot-rolled	6.37c.
SAE, 6100, hot-rolled, annealed	10.52c.
SAE 2300, cold-rolled annealed	9.00c.
SAE 3100, cold-rolled, annealed	8.55c.

Floor plate, 1/8 in. and heavier	5.60c.
Standard tool steel	12.50c.
Wire, black, annealed (No. 9)	4.25c.
Wire, galv. (No. 9)	4.60c.
Tire steel, 1 x 1/4 in. and larger	4.61c.
Open-hearth spring steel	4.75c. to 10.25c.
Common wire nails, base per kg	3.25c.

<i>Per Cent Off List</i>	
Machine bolts, square head and nut: All diameters.	Prices on application
Carriage bolts, cut thread: All diameters.	Prices on application
* No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.	
† 125 lb. and more.	

ST. LOUIS

	<i>Base per Lb.</i>
Plates and struc. shapes	3.99c.
Bars, soft steel (rounds and flats)	4.09c.
Bars, soft steel (squares, hexagons, ovals, half ovals and half rounds)	4.24c.
Cold-fin. rounds, shafting, screw stock	4.54c.
Hot-rolled annealed sheets (No. 24)	4.84c.
Galv. sheets (No. 24*)	5.49c.
Hot-rolled sheets (No. 10)	4.09c.
Black corrug. sheets (No. 24*)	4.89c.
2 galv. corrug. sheets	5.54c.
Structural rivets	4.94c.
Boiler rivets	5.04c.

<i>Per Cent Off List</i>	
Tank rivets, 7/16 in. and smaller	
Machine and carriage bolts, lag screws, fitting up bolts, bolt ends, plow bolts, hot-pressed nuts, square and hexagon, tapped or blank, semi-finished nuts; all quantities	65
* No. 26 and lighter take special prices.	

PHILADELPHIA

	<i>Base per Lb.</i>
*Plates, 1/4-in. and heavier	3.80c.
*Structural shapes	3.80c.
*Soft steel bars, small shapes, iron bars (except bands)	3.90c.
*Hot-rolled steel bars, sq. twisted and deformed	3.43c.
Cold-finished steel bars	4.53c.
*Steel hoops	4.25c.
*Steel bands, No. 12 and 3/16 in. incl.	4.00c.
Spring steel	5.40c.
*Hot-rolled anneal. sheets (No. 24)	4.65c.
*Galvanized sheets (No. 24)	5.30c.
*Hot-rolled annealed sheets (No. 10)	3.90c.
Diam. pat. floor plates, 1/4 in.	5.45c.

These prices are subject to quantity differential except on reinforcing and Swedish iron bars.

* Base prices subject to deduction on orders aggregating 4000 lb. or over.

† For 25 bundles or over.

‡ For less than 2000 lb.

CLEVELAND

	<i>Base per Lb.</i>
Plates and struc. shapes	3.86c.
Soft steel bars	3.75c.

*Reinforc. steel bars

2.60c.

Cold-finished steel bars

4.30c.

Hot-rolled strip, 6 in. wide and under

4.16c.

Cold-finished strip

3.60c.

Hot-rolled annealed sheets (No. 24)

4.66c.

Galvanized sheets (No. 24)

5.31c.

Hot-rolled 3/16 in. to 48 in. wide sheets

3.91c.

Floor plates, 3/16 in. and heavier

5.76c.

*Black ann'd wire, per 100 lb.

\$3.40

*No. 9 galv. wire, per 100 lb.

3.30

*Com. wire nails, base per keg.

2.96

Per Cent Off List

Machine and carriage bolts, small

65 and 5

Large

60 and 10

Nuts, 100 count

1/4 in. and smaller

65 and 5

9/16 in. to 1 in.

60 and 10

† Outside delivery 10c. less.

For 5000 lb. or less.

‡ Plus switching and cartage charges and quantity differentials up to 50c.

CINCINNATI

Base per Lb.

Plates and struc. shapes

3.95c.

Floor plates

5.55c.

Bars, rounds, flats and angles

4.05c.

Other shapes

4.20c.

Rail steel reinforc. bars

3.75c.

Hoops and bands, 3/16 in. and lighter

4.25c.

Cold-finished bars

4.60c.

Hot-rolled annealed sheets (No. 24) 3500 lb. or more

4.60c.

Galv. sheets (No. 24) 3500 lb. or more

5.25

Hot-rolled sheets (No. 10)

4.00c.

Small rivets

55 per cent off list

No. 9 ann'd wire, per 100 lb. (1000 lb. or over)

\$3.48

Com. wire nails, base per kg:

Any quantity less than carload. 3.20

keg

3.50

Chain, lin. per 100 lb.

3.35

Net

DETROIT

Base per Lb.

Soft steel bars	3.49c.
Structural shapes	3.95c.
Plates	3.95c.
Floor plates	5.85c.
Hot-rolled annealed sheets (No. 24)*	4.69c.
Hot-rolled sheets (No. 10)	3.94c.
Galvanized sheets (No. 24)*	5.40c.
Bands and hoops	4.19c.
Cold-finished bars	4.30c.
Cold-rolled strip	3.78c.
Hot-rolled alloy steel (S.A.E. 3100 Series)	6.44c.
Quantity differential on bars, plates, structural shapes, bands, hoops, floor plates and heavy hot- rolled: Under 100 lb., 1.50c. over base; 100 to 399 lb., base plus .50c.; 400 to 3999 lb. base; 4000 to 9999 lb., base less .10c.; 10,000 lb. and over, less .15c.	
* Under 400 lb., .50c. over base; 400 to 1499 lb., base; 1500 to 3499 lb., base less .10c.; 3500 lb. and over, base less .15c.	

Prices delivered by truck in metropolitan Detroit, subject to quantity differentials covering shipment at one time.

Galvanized and hot-rolled annealed may not be combined to obtain quantity deductions.

MILWAUKEE

Base per Lb.

Plates and structural shapes..	3.86c.
Soft steel bars, rounds up to 8 in., flats and fillet angles..	3.96c.
Soft steel bars, squares and hexagons	4.11c.
Hot-rolled strip	4.21c.
Hot-rolled annealed sheets (No. 24)	4.71c.
Galvanized sheets (No. 24)	5.86c.
Cold-finished steel bars	4.1c.
Structural rivets (keg lots)	5.16c.
Boiler rivets, cone head (keg lots)	5.26c.
Track spikes (keg lots)	4.61c.
Track bolts (keg lots)	5.81c.
Black annealed wire (No. 6 to No. 9 incl.)	4.05c.
Common wire nails and cement coated nails 1 to 14 kegs	3.25c.

Per Cent Off List

Machine bolts and carriage bolts, 1/2x6 and smaller or shorter...	65
Larger and longer up to 1 in., diam.	60-5
1 1/4 in. and larger	60
Coach and lag screws	60-5
Hot-pressed nuts, sq. and hex. tapped or blank, 1-199 lb....	50
200 lb. and over:	
1/2 in. and smaller	62 1/2
9/16 to 1 in.	60
1 1/4 in. and over	50

Prices given above are delivered Milwaukee.

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 3999 lb. On galvanized and No. 24 hot-rolled annealed sheets the prices given apply on orders of 400 to 1500 lb. On cold-finished bars the prices are for orders of 1000 lb. or more of a size.

ST. PAUL

Base per Lb.

Mild steel bars, rounds	4.10c.
Structural shapes	4.00c.
Plates	4.00c.
Cold-finished bars	4.55c.
Hot-rolled annealed sheets, No. 24	4.85c.
Galvanized sheets, No. 24.....	5.50c.

On mild steel bars, shapes and plates the base applies on 400 to 14,999 lb. On hot-rolled sheets, galvanized sheets and cold-rolled sheets base applies on 15,000 lb. and over. Base on cold-finished bars is 1000 lb. and over of a size.

BALTIMORE

Base per Lb.

Mild steel bars and small shapes	4.00c.
Structural shapes	3.90c.
Reinforcing bars, 5 to 15 tons.	3.16c.
Plates	3.90c.
Hot-rolled sheets, No. 10.....	3.95c.
Bands	4.20c.
Hoops	4.45c.
Special threading steel	4.15c.
Checkered floor plates 1/4 in. and heavier	5.50c.
Galvanized sheets, No. 24, 100 bds. or more	\$4.70
Cold-rolled rounds, hexagons, squares and flats, 1000 lb. and more	\$4.50

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets the base applies on orders 400 to 3999 lb.

All prices are f.o.b. consumers' plants.

For second zone add 10c. per 100 lb. for trucking.

PACIFIC COAST

Base per Lb.

Base	Fran-	Los	Seattle
Plates, tank and U. M.	4.05c.	4.30c.	4.25c.
Shapes, standard	4.05c.	4.30c.	4.25c.
Soft steel bars	4.20c.	4.30c.	4.45c.
Reinforcing bars, f.o.b. cars dock			
Pacific ports	2.975c.	2.975c.	3.625c.
Hot-rolled an- nealed sheets (No. 24)	5.15c.	5.05c.	5.35c.
Hot-rolled sheets (No. 10)	4.30c.	4.50c.	4.50c.
Galv. sheets (No. 24 and lighter)	5.85c.	5.55c.	5.90c.
Galv. sheets (No. 22 and heavier)	6.10c.	5.70c.	5.90c.
Cold-finished steel Rounds	6.80c.	6.85c.	7.10c.
Squares and hexagons	8.05c.	8.10c.	7.10c.
Flats	8.55c.	8.60c.	8.10c.
Common wire nails—base per keg less carload	\$3.65	\$3.60	\$3.70

All items subject to differentials for quantity.

CHATTANOOGA

Base per Lb.

Mild steel bars	4.21c.
Iron bars	4.21c.
Reinforcing bars	4.21c.
Reinforcing shapes	4.11c.
Plates	4.11c.
Hot-rolled sheets No. 10.....	4.16c.
Hot-rolled annealed sheets, No. 24*	4.06c.
Galvanized sheets No. 24*	4.76c.
Steel bands	4.41c.
Cold-finished bars	4.86c.

* Plus mill item extra.

MEMPHIS

Base per Lb.

Mild steel bars	4.31c.
Shapes, bar size	4.31c.
Iron bars	4.31c.
Structural shapes	4.21c.
Plates	4.21c.
Hot-rolled sheets, No. 10.....	4.26c.
Hot-rolled annealed sheets, No. 24	4.91c.
Galvanized sheets, No. 24.....	5.66c.
Steel bands	4.56c.
Cold-drawn rounds	4.80c.
Cold-drawn flats, squares, hexagons	6.80c.
Structural rivets	5.15c.
Bolts and nuts, per cent off list	55
Small rivets, per cent off list	55

NEW ORLEANS

Base per Lb.

Mild steel bars	4.20c.
Reinforcing bars	3.21c.
Structural shapes	4.10c.
Plates	4.10c.
Hot-rolled sheets, No. 10.....	4.35c.
Steel bands	4.75c.
Cold-finished steel bars	5.10c.
Structural rivets	4.85c.
Boiler rivets	4.85c.
Common wire nails, base per keg	\$3.55
Bolts and nuts, per cent off list	60

Magnesite Brick

Per Net Ton

Standard f.o.b. Baltimore and Plymouth Meeting and Chester	\$49.00
Chemically bonded f.o.b. Balti- more, Plymouth Meeting and Chester, Pa.	49.00

Grain Magnesite

Per Net Ton

Imported, f.o.b. Baltimore and Chester, Pa. (in sacks)	\$45.00
Domestic, f.o.b. Baltimore and Chester, in sacks	43.00
Domestic, f.o.b. Chewelah, Wash.	25.00

RAW MATERIALS PRICES

PIG IRON

No. 2 Foundry

F.o.b. Everett, Mass.	\$25.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa., and Sparrows Point, Md.	25.00
Delivered Brooklyn	27.27
Delivered Newark or Jersey City	26.39
Delivered Philadelphia	25.76
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Buffalo, Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	24.00
F.o.b. Jackson, Ohio	25.75
Delivered Cincinnati	24.07
F.o.b. Duluth	24.50
F.o.b. Provo, Utah	22.00
Delivered San Francisco, Los Angeles or Seattle	\$26.50
F.o.b. Birmingham*	20.38

* Delivered prices on southern iron for shipment to northern points are \$8c. a ton below delivered prices from nearest northern basing point on iron with phosphorus content of 7% and over.

Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same.

Basic

F.o.b. Everett, Mass.	\$25.75
F.o.b. Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md.	24.50
F.o.b. Buffalo	23.00
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	23.50
Delivered Cincinnati	24.51
Delivered Canton, Ohio	24.76
Delivered Mansfield, Ohio	25.26
F.o.b. Jackson, Ohio	25.50
F.o.b. Birmingham	19.00

Bessemer

F.o.b. Everett, Mass.	\$26.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa.	26.00
Delivered Boston Switching District	26.50
Delivered Newark or Jersey City	27.39
Delivered Philadelphia	26.76
F.o.b. Buffalo and Erie, Pa., and Duluth	25.00
F.o.b. Neville Island and Sharpsville, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago	24.50
F.o.b. Birmingham	25.00
Delivered Cincinnati	25.51
Delivered Canton, Ohio	25.76
Delivered Mansfield, Ohio	26.26

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.

Valley or Pittsburgh furnace...\$23.50

Charcoal

Lake Superior furnace....\$27.00
Delivered Chicago.....30.04

Canadian Pig Iron

Per Gross Ton

Delivered Toronto	
No. 1 fdy., sll. 2.25 to 2.75....\$26.50	
No. 2 fdy., sll. 1.75 to 2.25....25.50	
Malleable.....26.00	
Basic.....25.50	
Delivered Montreal	
No. 1 fdy., sll. 2.25 to 2.75....\$27.50	
No. 2 fdy., sll. 1.75 to 2.25....27.00	
Malleable.....27.50	
Basic.....27.00	

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload).....\$102.50

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%.....\$23.00

F.o.b. New Orleans.....33.00

Electric Ferrosilicon

Per Gross Ton Delivered

50% (carloads).....\$69.50

50% (ton lots).....77.00

75% (carloads).....126.00

75% (ton lots).....136.00

Silvery Iron

Per Gross Ton

F.o.b. Jackson, Ohio, 5.00 to 5.50%.....\$27.50

For each additional 0.5% silicon up to 17%, 50c. a ton is added.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Manganese, each unit over 2%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

Bessemer Ferrosilicon

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton

10.00 to 10.50%.....\$33.50

10.51 to 11.00%.....34.00

11.01 to 11.50%.....34.50

11.51 to 12.00%.....35.00

12.01 to 12.50%.....35.50

12.51 to 13.00%.....36.00

13.01 to 13.50%.....36.50

13.51 to 14.00%.....37.00

14.01 to 14.50%.....37.50

14.51 to 15.00%.....38.00

15.01 to 15.50%.....38.50

15.51 to 16.00%.....39.00

16.01 to 16.50%.....39.50

16.51 to 17.00%.....40.00

Manganese 2 to 3%, \$1 a ton additional. For each unit of manganese over 3%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Other Ferroalloys

Ferrotungsten, per lb. contained W del., carloads.....\$1.80

Ferrotungsten, lots of 5000 lbs. 1.85

Ferrotungsten, smaller lots.....1.90

Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr per lb. contained Cr delivered, in carloads, and contract.....10.50c.

Ferrochromium, 2% carbon.....16.50c. to 17.00c.*

Ferrochromium, 1% carbon.....17.50c. to 18.00c.*

Ferrochromium, 0.10% carbon.....19.50c. to 20.00c.*

Ferrochromium, 0.06% carbon.....20.00c. to 20.50c.*

Ferrovanadium, del. per lb. contained V.....\$2.70 to \$2.90

Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y.\$2.50*

Ferrocobaltitanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton.....\$142.50

Ferrocobaltitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton.....\$157.50

Ferrophosphorus, electric, or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with \$3 unitage, freight equalized with Rockdale, Tenn., per gross ton.....63.50

Ferrophosphorus, electric, 24%, in carlots, f.o.b. Anniston, Ala., per gross ton with \$3 unitage, freight equalized with Nashville, Tenn.80.00

Ferromolybdenum, per lb. Mo del.....95c.

Calcium molybdate, per lb. Mo del.....80c.

Silico spiegel, per ton, f.o.b. furnace, carloads.....\$45.00

Ton lots or less, per ton....50.00

Silico-manganese, gross ton, delivered.

3%.....101.50

2.50% carbon grade.....106.50

2% carbon grade.....111.50

1% carbon grade.....121.50

* Spot prices are \$5 a ton higher. Spot premium on 75 per cent ferrosilicon is \$10 a ton.

ORES

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton

Old range, Bessemer, 51.50%.....\$5.25

Old range, non-Bessemer, 51.50%.....5.10

Mesabi, Bessemer, 51.50%.....5.10

Mesabi, non-Bessemer, 51.50%.....\$4.95

High phosphorus, 51.50%.....4.86

Foreign Ore

C.i.f. Philadelphia or Baltimore

Per Unit

Iron, low phos., copper free, 55 to 58% dry, Algeria, nominal 17.00c.

Iron, low phos., Swedish, average, 68½% iron.....Nominal

Iron, basic or foundry, Swedish, aver. 65% iron.....Nominal

Iron, basic or foundry, Russian, aver. 65% iron.....Nominal

Man., Caucasian, washed 52%.....5c.

Man., African, Indian, 44-48%.....Nominal

Man., African, Indian, 49-51%.....Nominal

Man., Brazilian, 46 to 48%.....Nominal

52%.....24.50

Man., African, Indian, 44-48%.....Nominal

Man., African, Indian, 49-51%.....Nominal

Man., Brazilian, 46 to 48%.....Nominal

52%.....24.50

Man., African, Indian, 44-48%.....Nominal

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52%.....24.50

Man., African, Indian, 44-48%.....Nominal

Man., African, Indian, 49-51%.....Nominal

Man., Brazilian, 46 to 48%.....Nominal

One-Ton Welding Manipulator

THIS one-ton Welding Manipulator for use in any shop where welded units are made is of an entirely new design which affords many advantages in handling the job so that all welds can be made in the down-V welding position. It is built by United Engineering & Foundry Co., Pittsburgh.

The faceplate can be tilted from a position of 45 deg. back underneath the vertical around through the vertical to a position of 30 deg. beyond the horizontal, making a total tilting angle of 165 deg. In addition to the tilting angle, the faceplate may be rotated through 360 deg. in either direction simultaneously with or independent of the tilting.

Both motions are individually power driven by separate motors and controls through self-locking worm units which permit locating the faceplate in an infinite number of positions without the use of locking pins, clutches, etc.

The faceplate has many provisions for easily and readily mounting the work, consisting of tee-slots, through holes, tapped holes and means for supporting extension bars. With these manipulators the work can be properly handled for the placing of all welds in a down-V welding position.



to meet demands of rerollers. Rolled steel is urgently needed and home demand is absorbing the bulk of output.

Quotations are really nominal as no fresh orders are accepted for this year's shipment and next year's prices are as yet unfixed.

Tin plate demand is moderate but would increase if mills were able to accept orders. Mills want steel to execute current business, and uncertainties of next year's

costs hamper far forward buying. Unfilled orders are below 6,250,000 base boxes. Operations are at 75 per cent.

Black and galvanized sheet export demand is broadening but business is governed by steel scarcity.

Continental iron and steel market is quiet but works are well placed for some months. Sino-Japanese conflict is interrupting Far Eastern business.



...No relief in sight for sold-up mill condition and steel shortage.

LONDON, Sept. 8, (By Cable)— Iron and steel demand is maintained but makers are heavily sold and are accepting new business only for delivery next year and at prices then ruling. Overseas pig iron buyers are ready to place orders at well over the home prices, but the bulk of this business is necessarily refused. Furnaces are endeavoring to reduce arrears but consumers are still working hand-to-mouth.

The semi-finished steel position is little improved, with only small arrivals from the Continent to date, and British works are unable

For all Purposes

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WIRE ROPE

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1857



A. Leschen & Sons Rope Co.
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Round Strand
Flattened Strand
"P. F. S."
Non-Rotating
Preformed
Steel Clad
Locked Coil
Regular Lay
Lang's Lay
Hemp Center
Wire Rope Center
Metallic Core
Seale - Filler Wire
Warrington



THIS WEEK'S MACHINE ...TOOL ACTIVITIES...

... August sales were at a high level in many centers, considering the season.

• • •

... Foreign business a substantial factor, tending to increase backlog and extend delivery promises.

• • •

... Some price increases reported from Chicago.

Cincinnati

MODERATE improvement in lathes and drills the past week moved market averages to the best level of August, but the month's totals are still below previous highs. Comment in the trade, however, indicates that the vacation month was better than anticipated and strengthens market feeling of good demand through the fall. Foreign business in all lines is still a feature of the market, although this does not outweigh domestic ordering.

While most manufacturers report easier deliveries, builders of lathes and smaller tools indicate backlog up to five and six months. With the short shutdown over Labor Day, plants will run close to capacity to offset loss of production the remainder of this week.

Detroit

LABOR DAY marks a bend in the curve of all automotive activities, so it is generally anticipated that inquiries for moderate quantities of new equipment to fill in production lines and to complete buying programs will be forthcoming soon. Recent weeks have been the slowest in months in regard to inquiries and orders. Much time must still be devoted in the automobile factories to installing new equipment and getting it operating. The Briggs Mfg. Co. is clearing out 60,000 sq. ft. on the fifth floor of the Highland Park plant for the manufacture of molding and window trim which formerly was handled by Motor Products for Chrysler bodies. Briggs is already at work on

a lower floor doing enameling and baking of stock supplied by Motor Products and Detroit Moulding Co. Obviously considerable new equipment will be required by Briggs for its fifth floor division. Brass Forgings, Inc., at present located near downtown Detroit, will move in about four weeks to a new plant 50 x 150 ft. in Ferndale, Mich. The cost of the plant will be \$22,000, not including equipment. Forging press equipment is to be added shortly to the hammer equipment now available and capacity will be doubled.

New York

AUGUST proved to have been a much better than average summer month, and, despite the interruptions of vacations, a substantial volume business was placed. For one dealer, the August volume was equal to the peak volume in March. Orders came from a variety of sources in lots of single machines, and new inquiries are on the same basis. No large lists are pending, but on the basis of outstanding quotations the month of September should be a good one when the sales tallies are finally made. Business placed in the pre-holiday week also held up well, being particularly active in sheet metal fabricating machinery. New railroad inquiry is absent, but the Erie has bought two machines against previous inquiries. Neither the New York Central, nor the New Haven have taken any action on tools asked for several weeks ago. With the renewed influx of foreign orders, particularly from the Russians, tending to boost

machine tool factory backlog, deliveries are showing no improvement, the average promise now being six months. Some equipment is being quoted for delivery at the end of February.

Pittsburgh

MACHINE tool orders in the past week have been without much change from the previous period. There are indications that business in the next few months will show considerable improvement over the last 60 days. Already inquiries are heavier. Meanwhile, manufacturers continue active against previous orders and shipments as well maintained.

Chicago

AUGUST sales were well above those of July, the low month of the year. Although no one doubts that September and October will be better than August, there still is some uncertainty in the trade as to just how good the autumn season will be. Because of extended deliveries and rising costs of manufacture, the prices of a drilling line and a planer line have been increased 10 per cent, effective at once, while a 5 per cent boost a month ago in grinding disks helped make August a big month for this particular item, considerable warning being given before the new quotations went into effect. Inquiries are picking up in volume to some extent, but are mostly for one or two machines each. Little purchasing has been done yet at the Case plant in Burlington, Iowa, but orders from there are expected soon. Some buying is still under way for Allis-Chalmers' new tractor motor plant in Milwaukee, and additional business is anticipated from the Electro-Motive Corp. in LaGrange for its new plant addition. Large industrial lists are still few and far between, and steel companies and railroads remain inactive as tool buyers.

Cleveland

EXPANSION programs of some of the leading agricultural implement manufacturers have resulted in a very active demand for machine tools, and a Cleveland manufacturer received sizable orders from that source during the past week. Otherwise the volume of business continues to show a slight downward trend and deliveries show quite an improvement. Dealers' sales are limited to scattered orders for single machines.

Quite a spurt of new foreign inquiry has developed. Russia is again in the market for American machine tools, and a Cleveland manufacturer has been asked for quotations on 80 turret lathes for delivery to that country. A new inquiry has also come from Japan which wants new machine tools for as prompt deliveries as possible.

Machine tool manufacturers look for an improvement in business in September and predict a good volume of orders during the last quarter.

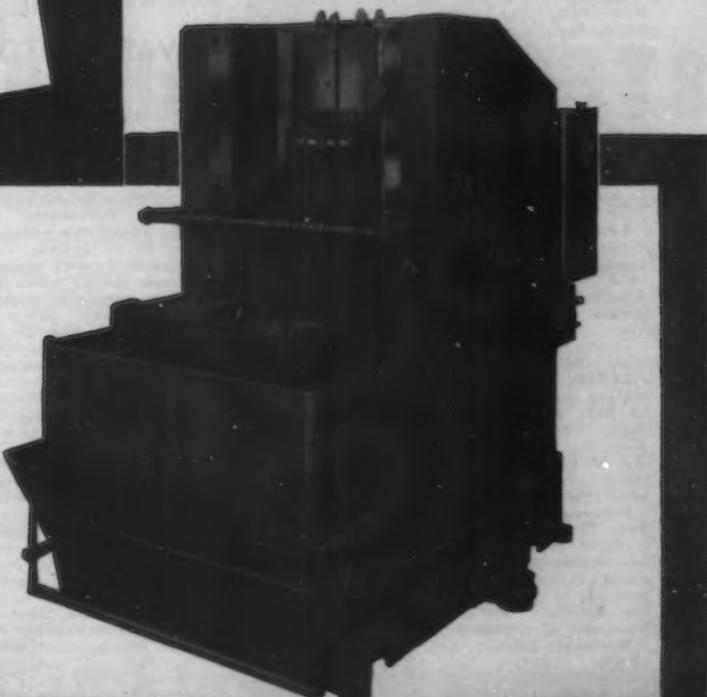
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Naturally

• In internationally famous machine building houses of every description, Oilgear Surface Broaching Machines are setting new high production records at remarkable tolerances.

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- 6, 10, 16, 20 ton capacities

THE LEADERS CHOOSE the leading Surface Broaching Machine

Leaders "get that way" by searching out every better means to better production, every available means to cutting costs and speeding operations. And with facilities to find what they search for it is not surprising that leaders choose Oilgear Surface Broaching Machines. The one Surface Broaching Machine that embodies the famous Oilgear Variable Delivery Pump. And hence the one Surface Broaching Machine that offers the smoothness of operation, the incomparable dependability of performance, the negligible maintenance costs which Oilgear has discovered to Industry. Write for full information of the remarkable Oilgear Surface Broaching Machine . . . including Bulletin 23,000A. THE OILGEAR COMPANY, 1303 West Bruce Street, Milwaukee, Wis.



OILGEAR SURFACE BROACHING MACHINES



PLANT EXPANSION AND EQUIPMENT BUYING

◀ NORTH ATLANTIC ▶

Electro Metallurgical Co., 30 East Forty-second Street, New York, manufacturer of ferroalloys, calcium carbide, graphite products, etc., plans new electric furnace plant in Colbert County, Ala., near Wilson Dam. Cost reported over \$500,000. Contract for electric power has been made with TVA. Company is a subsidiary of Union Carbide & Carbon Corp., New York.

Signal Corps Procurement District, Army Base, Fifty-eighth Street and First Avenue, Brooklyn, asks bids until Sept. 27 for 590,000 ft. of wire, 45,500 ft. of cable, and 18 reels (Circular 24).

Andrews & Perillo, 117 East Eighteenth Street, New York, manufacturers of mechanical and electrical devices and equipment, have leased one-story building at 39-30 Crescent Street, Long Island City, for new plant.

Canada Dry Ginger Ale, Inc., 100 East Forty-second Street, New York, has plans for one-story factory branch, storage and distributing plant, 100 x 145 ft., at Shrewsbury, Mass., superstructure to begin early in fall. Cost about \$65,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Sept. 14 for forged steel crank-shafts (Schedule 1541), 650 acetylene and oxygen cylinder regulators (Schedule 1549), 325 acetylene oxygen and hydrogen pressure gages, and 80 hydrogen and oxygen pressure gages (Schedule 1551), pressure and vacuum gages (Schedule 1553) for Brooklyn Navy Yard.

Bulova Watch Co., 580 Fifth Avenue, New York, has organized Sag Harbor Guild, Inc., a subsidiary, to manufacture watch cases. New company has leased part of former factory of Joseph Fahys Co., manufacturer of similar products, at Sag Harbor, L. I., for plant, with facilities for production of over 15,000 watch cases weekly.

Continental Can Co., 100 East Forty-second Street, New York, will take bids soon on general contract for one-story branch plant at St. Laurent, Que. Cost close to \$300,000 with equipment.

Long Island Railroad Co., Pennsylvania Station, New York, and Jamaica, L. I., has filed plans for one-story machine shop, 50 x 120 ft., at Second Street and Borden Avenue, Long Island City. J. S. McDonald, Jamaica office, is company architect.

Commanding Officer, Ordnance Department, Picatinny Arsenal, Dover, N. J., asks bids until Sept. 14 for special thread milling hobs, reamers, taps, chaser sets, oil hole drills, etc. (Circular 118) until Sept. 17 for reworking 71,100 lb. of metal (Circular 98); until Sept. 27, for converting 16,795 lb. of aluminum turnings and scrap into aluminum tubing, rod and strip (Circular 114).

Luscombe Airplane Development Corp., Bear Tavern Road, Trenton, N. J., manufacturer of all-metal light-type aircraft, has arranged for sale of stock, totaling about \$487,000, a considerable part of proceeds to be used for expansion, including buildings and equipment. Don A. Luscombe is president.

National Transit Co., Center Bridge (Bucks County), Pa., plans rebuilding bulk oil storage and distributing plant recently destroyed by fire. Loss about \$60,000 including steel tanks and equipment.

Commanding Officer, Ordnance Department, Frankford Arsenal, Philadelphia, asks bids until Sept. 13 for one motor-driven precision bench lathe (Circular 147), 12 micrometer calipers (Circular 145), eight shaft sleeve bushings and eight

sets of casing bushing rings (Circular 170), special nickel-chrome castings (Circular 169), thread plug, plain plug and thread ring gages (Circular 143); until Sept. 14, six finish recess blades, three rough recess tools, six angular cut-off blades and six pointing blades (Circular 163), 35,500 steel forgings (Circular 148), 48 drivers and 12 tail-stock centers for gear-cutting machines (Circular 164); until Sept. 15, one motor-driven surface grinding machine (Circular 161), one machine for notching 5-in. shells (Circular 160), two, three, four or five automatic chucking and turning lathes (Circular 162).

◀ BUFFALO DISTRICT ▶

International Graphite & Electrode Corp., Packard Road, Niagara Falls, N. Y., has let general contract to Laur & Mack, 1400 College Avenue, for one-story addition, primarily for storage and distribution. Cost close to \$40,000 with equipment. Main offices of company are at St. Marys, Pa.

Remington Rand, Inc., 465 Washington Street, Buffalo, has authorized plans for addition to branch plant at Hamilton, Ont., used for manufacture of noiseless typewriters, including parts production and assembling, to increase present floor space about one-third. Cost over \$150,000 with equipment.

Simon Brewery, 705 Clinton Street, Buffalo, will soon make award for one-story addition. Cost about \$50,000 with equipment. Julius C. Schultz, 1370 Main Street, is architect.

◀ WASHINGTON DIST. ▶

E. I. duPont deNemours & Co., Wilmington, Del., has approved plans for new plant for its subsidiary, Old Hickory Chemical Co., at Bellewood, Va., for production of carbon bisulphide and other industrial chemicals. It is scheduled for completion early next year. Cost close to \$700,000 with equipment.

General Purchasing Officer, Panama Canal, Washington, asks bids until Sept. 13 for 60,000 railway tie plates, 18 cast iron bends, tees, flanges, nipples, etc. (Schedule 3285); until Sept. 16, 7200 ft. of 2½-in. wire rope, 14,000 lb. track bolts, machine screws, galvanized steel bolts, carriage bolts, 5200 lb. steel nuts, brass nuts, steel rivets, corrosion-resisting steel rivets, cast iron washers, iron or steel plate washers, galvanized turnbuckles, manhole frames and covers, copper tubing, 34,000 lin. ft. of galvanized steel wire poultry netting, 8000 lin. ft. of galvanized steel wire cloth, 6000 sq. ft. of steel wire cloth, 73,000 lin. ft. of copper wire cloth, electric panel-boards, transformers, electric motors, 20,000 ft. cross connecting wire, rubber insulated cable, copper magnet wire, aluminum shell sockets, conductor cable and other equipment (Schedule 3286).

Northern Neck Electric Co-operative Association, Lively, Va., plans new steam-electric generating plant for power supply for rural electrification system. Fund of \$184,000 has been secured through Federal aid for this and construction of distributing lines.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Sept. 14 for automatic steering equipments for Portsmouth, N. H., and Mare Island, Cal., Navy yards (Schedule 1538), valves for Philadelphia yard (Schedule 1542), one motor-driven aircraft engine cylinder grinder for Eastern or Western

yard (Schedule 1531), electric water heaters and spare parts for Puget Sound, Wash., and Eastern Navy yards (Schedule 1540).

◀ NEW ENGLAND ▶

A. C. Gilbert Co., Blatchley Avenue, New Haven, Conn., manufacturer of electric motors, fans, heaters and parts, has asked bids on general contract for three-story addition, 68 x 112 ft. Cost over \$75,000 with equipment. Westcott & Mapes, Inc., New Haven, is architect and engineer.

Shawinigan Resins Corp., 50 State Street, Boston, Elliot N. Jones, president, recently organized to manufacture industrial chemicals, has let general contract to Adams & Ruxton Construction Co., 1387 Main Street, Springfield, Mass., for new plant at Indian Orchard, Mass. Cost over \$65,000 with equipment. McClinton & Craig, 458 Bridge Street, Springfield, are architects and engineers.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Sept. 21 for copper-nickel alloy forgings (Schedule 1572), hot pressed naval brass forgings (Schedule 1575), alloy steel forgings, treated alloy steel forgings and pearlitic manganese steel forgings (Schedule 1571), for Naval Station, Newport, R. I.

L. G. Balfour Co., County Street, Attleboro, Mass., manufacturer of plated jewelry, emblems, badges, etc., has let general contract to Central Engineering & Construction Co., 210 Main Street, Pawtucket, R. I., for two-story addition, 40 x 80 ft. Cost close to \$45,000 with equipment.

New Haven Clock Co., New Haven, Conn., has leased one-story factory at Guilford, Conn., formerly occupied by Guilford Wheel Co., totaling 11,000 sq. ft. floor space, and will modernize for branch plant for production of parts for electric automobile clocks.

◀ SOUTH ATLANTIC ▶

Southern Cotton Oil Co., Dawson, Ga., has let general contract to K. J. Edgely Construction Co., Albany, Ga., for one-story addition, 70 x 170 ft., for storage and distribution. Cost close to \$40,000 with equipment.

Protect-U-Awning Shutter Corp., 233 N.W. Twenty-third Street, Miami, Fla., manufacturer of awning frames and operating mechanisms, has plans for one-story plant, 80 x 300 ft. Cost over \$50,000 with equipment.

Hercules Powder Co., Brunswick, Ga., manufacturer of industrial chemicals, naval stores, etc., has plans for expansion and improvements, including several one-story units and equipment. Cost about \$150,000 with equipment. Main offices are at Wilmington, Del.

◀ SOUTHWEST ▶

Atchison, Topeka & Santa Fe Railway Co., Topeka, Kan., plans one-story shop, 70 x 110 ft., at car construction and repair works on North Woodruff Avenue. Cost close to \$40,000 with equipment.

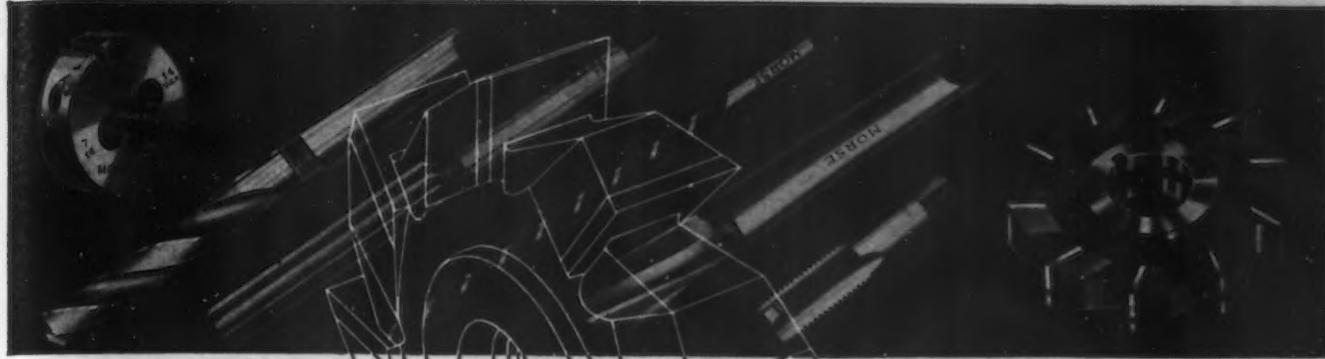
Continental Baking Co., Capitol Avenue, Little Rock, Ark., has let general contract to George H. Burden Construction Co., 4422 I Street, for one-story baking plant for which several buildings are now being razed. Cost about \$180,000 with traveling ovens, conveyors, loaders, air-conditioning system and other equipment. Thompson, Sanders & Ginocchio, Hall Building, are architects. Main offices of company are at New York.

Board of Education, Pittsburg, Kan., plans manual training department in new two-story and basement junior high school. Cost \$260,000. Financing has been arranged through Federal loan and grant. Thomas W. Williamson Co., National Bank of Topeka Building, Topeka, Kan., is architect.

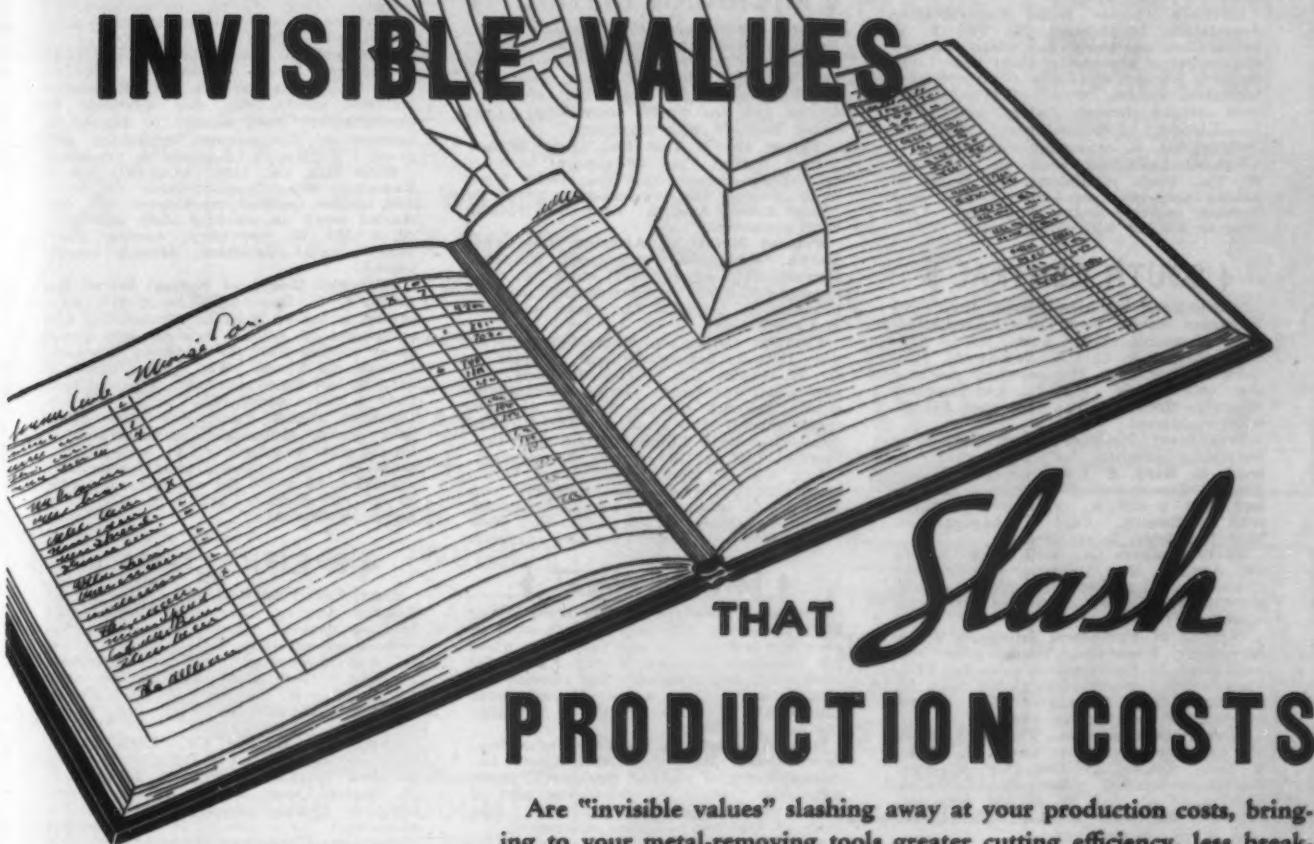
Lukens Milling Co., Atchison, Kan., plans rebuilding part of four-story flour mill and elevator units recently destroyed by fire. Loss about \$200,000 with elevating screening, conveying, loading and other mechanical equipment.

City Council, Rockport, Tex., plans new municipal electric power plant, installation to include two diesel engine-generator units and auxiliary equipment, cooling tower, etc.; also distribution system. Fund of \$105,000 has been secured through Federal aid.

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Street, Fort Worth, Tex., has let general contract to Gurley Construction Co., First National Bank Building, for one-story mechanical-bottling unit, 50 x 200 ft. Cost close to \$50,000 with equipment. Preston M. Green, 806 Burnett Street, is architect; R. K. Werner, Waggoner Building, is mechanical engineer.

Quartermaster, Fort D. A. Russell, Tex., asks bids until Sept. 20 for one gasoline engine-operated concrete mixer, and eight storage tanks, each 300-gal. capacity (Proposal 550-5).

◀ WESTERN PA. DIST. ▶

Penn Brass & Copper Co., 1130 West Eighteenth Street, Erie, Pa., manufacturer of brass, bronze and copper tubing, and kindred products, has asked bids on general contract for one-story addition, 150 x 350 ft. Cost over \$100,000 with equipment.

Harrison County Rural Electrification Association, Lumberport, W. Va., E. V. Richardson, chairman, has plans for new steam-electric generating plant near Lumberport, for power supply for rural electrification system. Fund of \$100,000 has been secured through Federal aid. Louis T. Klauder, Lincoln-Liberty Building, Philadelphia, is consulting engineer.

Laurel Smokeless Coal Co., Beckley, W. Va., plans rebuilding coal tipple at mining properties on Laurel Creek, near Beckley, recently destroyed by fire. Loss close to \$75,000 with equipment.

◀ SOUTH CENTRAL ▶

Bishop-Edell Machine Works, Inc., 1008 Magazine Street, New Orleans, manufacturer of machinery and parts, has let general contract to Carl E. Woodward, Inc., Louisiana Building, for one-story machine shop addition, 40 x 115 ft., and improvements in present unit. Cost over \$40,000 with equipment.

Frankford Distillery, Inc., Columbia Building, Louisville, has let general contract to Hays & Nicolin, 3928 Massie Avenue, for one-story mechanical-bottling unit, 220 x 335 ft. Cost over \$100,000 with equipment. Carl J. Epping, 806 East Broadway, is architect.

Harry Brothers Co., 3505 South Carrollton Avenue, New Orleans, manufacturer of sheet metal products, has plans for one-story addition. Cost close to \$50,000 with equipment.

Director of Purchases, Tennessee Valley Authority, Knoxville, Tenn., asks bids until Sept. 12 for insulated cable for Pickwick Landing power plant; until Sept. 17, air-conditioning machinery for control building at same power plant.

Biedenharn Candy Co., Vicksburg, Miss., has let general contract to W. J. McGee & Sons, Lamar Building, for one-story mechanical-bottling plant for Coca-Cola division. Cost close to \$60,000 with machinery. Raymond Birchett, 1427 Chambers Street, is architect.

◀ OHIO AND INDIANA ▶

Republic Steel Corp., Republic Buildings, Cleveland, has let general contract to Hunkin-Conkey Construction Co., 1740 East Twelfth Street, for two-story addition to machine shop at plant on Dennison Avenue, 48 x 218 ft.; also for crane runway, and two-story office and welfare building. Cost over \$100,000 with equipment.

Precision Die Castings Co., 12600 Berea Road, Cleveland, has plans for one-story addition, 60 x 130 ft. Cost close to \$50,000 with equipment. H. E. Shimmin, 1720 Euclid Avenue, is architect.

Falls Stamping & Welding Co., Cuyahoga Falls, Ohio, has plans for one-story addition, 60 x 80 ft. Cost about \$35,000 with equipment. E. Vance Florence, Cuyahoga Falls, is architect.

Contracting Officer, Material Division, Army Air Corps, Wright Field, Dayton, Ohio, asks bids until Sept. 13 for reamers (Circular 116), propeller gage assemblies and wrench assemblies (Circular 81); until Sept. 14, plunger assemblies, adapter assemblies and sight assemblies (Circular 60); until Sept. 20, tall wheel shock absorber strut bearings, pneu-hydraulic shock strut washers, pneu-hydraulic shock strut rings, pneu-hydraulic shock strut bearings, spacer rings, etc. (Circular 143); until Sept. 23, 1190 vacuum pump assemblies (Circular 128).

Elyria Foundry Co., Elyria, Ohio, manu-

facturer of machine tool and other castings, has let general contract to Henry Heidrich, Century Building, for three-story addition, 90 x 125 ft. Cost over \$75,000 with equipment. Company is affiliated with Industrial Brown Hoist Co., Bay City, Mich.

Board of School Trustees, Richmond, Ind., C. K. Robinson, secretary, plans installation of manual training department in new two-story and basement senior high school. Cost about \$670,000, of which \$257,700 will be represented by a Federal grant. Bids will be asked soon on general contract. John L. Hamilton, Tower Court, Chicago, is architect.

Contracting Officer, Quartermaster Corps, Quartermaster Depot, Jeffersonville, Ind., asks bids until Sept. 14 for 100 butcher saws, saw blades, boning knives, etc. (Circular 431-24).

◀ MICHIGAN DISTRICT ▶

Motor Wheel Corp., East Saginaw Street, Lansing, Mich., has let general contract to Reniger Construction Co., Lansing, for two one-story additions, about 90,000 sq. ft. floor space, for production of brake drums and for brake assembling. Cost about \$250,000 with machinery.

Expert Die & Tool Co., 13440 Klinger Street, Detroit, has let general contract to Krueger Construction Co., 16623 Wyoming Avenue, for new one-story plant on Mount Elliott Avenue. Cost over \$40,000 with equipment.

Pressed Metals of America, Inc., Port Huron, Mich., has authorized financing through sale of common stock to total close to \$300,000, a considerable part of proceeds to be used for plant additions and equipment.

Chrysler Corp., 341 Massachusetts Avenue, Detroit, has let general contract to O. W. Burke Co., Fisher Building, for new plant for Dodge Division on Mound Road, Macomb County, where 47 acre tract recently was acquired. It will comprise two main buildings, one and two-story, 402 x 1260 ft., and one-story, 108 x 120 ft., for production of $\frac{1}{2}$ -ton motor trucks. Cost over \$1,000,000 with equipment, instead of smaller amount, previously noted. Albert Kahn, Inc., New Center Building, is architect and engineer.

◀ MIDDLE WEST ▶

Central Scientific Co., 1700 West Irving Park Boulevard, Chicago, manufacturer of scientific instruments and parts, has plans for one-story addition, part of unit for production and remainder for storage and distribution. Cost about \$60,000 with equipment. J. Lyle Kincaid is company engineer in charge.

Duncan Foundry & Machine Works, Inc., Seventh and Market Streets, Alton, Ill., manufacturer of mining machinery, parts, mine cars, etc., plans rebuilding part of plant recently destroyed by fire. Loss close to \$130,000 including equipment.

Swift & Co., Union Stock Yards, Chicago, plan new plant at St. Boniface, Man., where about 20 acre tract has been acquired. It will include power house, machine shop and other mechanical divisions. Cost close to \$2,000,000 with equipment. Plant will be operated by Swift Canadian Packing Co., Elmwood district, Winnipeg, Canadian subsidiary.

District Quartermaster, Nebraska-South Dakota District, CCC, Omaha, Neb., asks bids until Sept. 13 for band saws, circular saws, motor-driven drill press, belt-drive bench grinders, lathes, sanders, shapers, jointers and other tools, band saw blades, cutters for shaper and drill press, countersink bits, bench screws, chisels, bolt and disk sander, pulleys and other equipment (Proposal 5701-13).

Village Clerk, Madelia, Minn., asks bids until Sept. 28 for diesel engine-generating units and accessories for municipal electric power plant; also for electric distributing system. Burlingame, Hitchcock & Estabrook, Sexton Building, Minneapolis, are consulting engineers.

United States Engineer Office, Fort Peck, Mont., asks bids until Sept. 13 for drop forged steel chain links, from $\frac{1}{2}$ to $\frac{3}{4}$ -in., and drop forged anchor shackles, from $\frac{1}{2}$ to 1-in., with pins $\frac{1}{2}$ to $1\frac{1}{2}$ -in. (Circular 84).

Falk Corp., 3001 West Canal Street, Milwaukee, has purchased casting, chipping and welding shop unit, 114 x 308 ft., one-story, of old National Brake & Electric Co. group at Milwaukee, which it is dismantling for re-erection at main works.

Purchase includes two 20-ton electric traveling cranes. When transfer is completed about Dec. 15, all Falk welding operations will be concentrated in re-erected shop.

Malleable Iron Range Co., Beaver Dam, Wis., manufacturer of stoves, ranges, electric refrigerators, etc., has placed contracts for foundry extension, 50 x 200 ft., to cost about \$40,000 with equipment.

Moto-Meter Gauge & Equipment Co., Toledo, Ohio, manufacturer of automotive products, is building addition to branch works at La Crosse, Wis., 111 x 166 ft., one-story and basement, to house assembly department, maintenance division and stock rooms. New equipment includes 30 punch presses, six automatic screw machines, two hand screw machines and two automatic plating barrels. Work is to be completed about Nov. 1.

Ariens Mfg. Co., Brillion, Wis., manufacturer of tillage tools, is building shop addition, 40 x 80 ft., to accommodate production of new cultivating implement introduced in 1933.

Atlas Metal Parts Co., 3244 North Thirty-first Street, Milwaukee, manufacturer of steel stampings for automobiles, tractors, trucks, etc., has increased its capitalization from \$25,000 to \$50,000 in preparation for general expansion program. William A. Schendel is president.

Holm Mfg. Co., 1303 Thirty-fifth Street, Kenosha, Wis., manufacturer of tools, dies, gages, special machinery, etc., has started work on machine shop extension, 30 x 120 ft., one-story, costing about \$30,000 with equipment, already largely placed.

Wisconsin Board of Normal School Regents, E. G. Doudna, Madison, Wis., secretary, is taking bids for construction and equipment of central heating and power plant costing \$100,000 at State Teachers' College, La Crosse, Wis. PWA grant of \$45,000 has been approved. Arthur Peabody is State architect.

Ampeco Metals, Inc., 3830 West Burnham Street, Milwaukee, manufacturer of bronze alloy castings, ingots, non-sparking tools, etc., has broken ground for foundry extension, 80 x 200 ft., one-story, designed by N. F. Backes, architect, 610 West Michigan Street.

◀ PACIFIC COAST ▶

Coast Centerless Grinding Co., 1049 East Slauson Avenue, Los Angeles, has asked bids on general contract for new plant, comprising one-story main unit, 100 x 160 ft., and three-story office and operating building. Cost close to \$100,000 with equipment. W. M. Bostock, 6221 Pacific Boulevard, Huntington Park, Cal., is engineer.

Procter & Gamble Co., Long Beach, Cal., manufacturer of soaps, washing powders, cleaners, etc., has engaged J. H. Davies, Ocean Center Building, engineer, to prepare plans for main seven-story unit, for expansion in oil processing division, and one-story structure for other production service. Cost about \$1,000,000 with equipment. Main offices of company are at Cincinnati.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Sept. 17 for spare parts for airplanes for Naval Air Station, San Diego, Cal. (Schedule 900-1081).

Columbia Breweries, Inc., 2120 South C Street, Tacoma, Wash., plans three-story mechanical-bottling unit, 60 x 110 ft. Cost over \$65,000 with machinery.

Board of Directors, Imperial Irrigation District, El Centro, Cal., asks bids until Sept. 21 for equipment for hydroelectric generating plant at Drop No. 4, All-American Canal, near Calexico, Cal., including one vertical shaft, 13,300 hp. hydraulic turbine, and one 12,000-kva. vertical shaft generator, with accessories; also governor with pumping equipment for regulating speed of waterwheel-generator unit. M. J. Dowd is chief engineer.

Bureau of Reclamation, Denver, asks bids until Sept. 17 for structural steel transmission towers for Pioche power circuit and switch station at Boulder switchyard, Boulder power plant, Boulder Canyon project (Specifications 970-D).

Fruehauf Trailer Co., 145 Eleventh Street, San Francisco, with main plant and headquarters at Detroit, has let general contract to Barrett & Hill, 918 Harrison Street, San Francisco, for one-story factory branch, storage and service plant. Cost close to \$45,000 with equipment. W. H. Ellison, 821 Market Street, is engineer.

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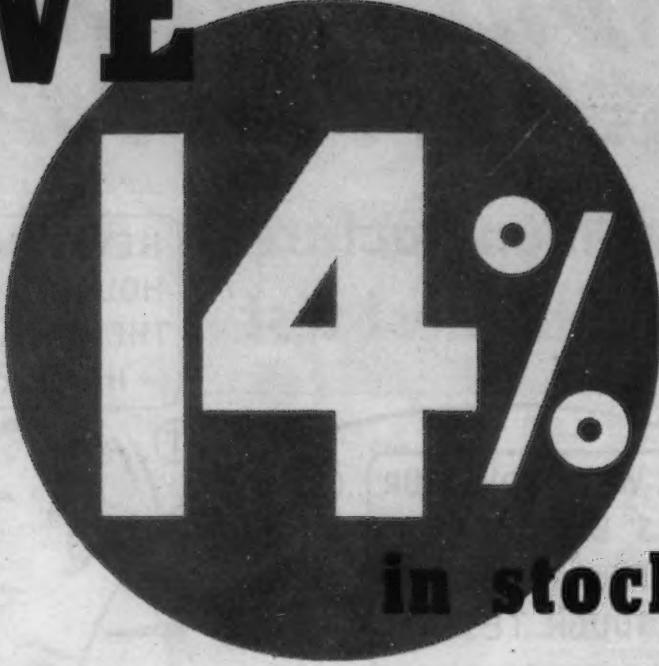
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New Industrial Literature

REVIEW OF CURRENT CATALOGS AND CIRCULARS • A TIME SAVING SERVICE FOR BUYERS

PUMPS.—Charles F. Elmes Engineering Works. Bulletin describing and illustrating high and low pressure pumping units. Includes operating specifications and tables of weights and dimensions. Bulletin 9-109.

ELECTRIC MOTORS.—Louis Allis Co. July-August issue of "The Messenger," house organ of the company. Illustrates shaftless and explosion proof motors. Also carries an interesting article on motor maintenance. Bulletin 9-110.

MACHINE TOOLS.—Barber-Colman Co. 263-page book describing hobs, milling cutters, reamers and other machine tools. Each subject is discussed from the angle of performance, maintenance and requirements, and is illustrated with photographs and diagrams. 62 pages of engineering data are included. Bulletin 9-111.

BERYLLIUM COPPER.—Riverside Metal Co. Booklet discussing beryllium copper with respect to its properties, workability and application. Numerous photographs illustrate actual applications. Material is non-sparking. Bulletin 9-112.

HYDRAULIC CYLINDERS.—Tomkins Johnson Co. Catalog H-37 describes various types of non-rotating, double acting cylinders for water or oil hydraulic work. Information on special hydraulic power units, spring actuated accumulators and engineering data also included. Bulletin 9-113.

STAINLESS STEEL TANKS.—Crowl Equipment Co. Folder describes non-corrosive equipment, tanks, etc., fabricated from 18-8 stainless steel. Bulletin 9-114.

PACKINGS.—U. S. Rubber Products, Inc. A "miniature" packing catalog featuring the eleven most commonly used packings. Designed as a reference source for engineers, plant operators and maintenance men. Bulletin 9-115.

WATER MAINS.—Youngstown Sheet & Tube Co. 120-page loose-leaf manual containing information on Youngstown special wrapped and lined steel water mains. Includes useful tables and charts covering basic hydraulic information and data used in water main flow capacity and pipe line computations. Bulletin 9-116.

POLISHING AND BUFFING MACHINES.—Hammond Machinery Builders. Catalog describes automatic polishing and buffing machines equipped with three motor-on-spindle polishing or buffing heads and indexing work table with eight revolving work spindles. Also available with rotary magnetic chucks. Bulletin 9-117.

COAL MINING EQUIPMENT.—Jeffery Mfg. Co. A series of bulletins covering coal loaders, automatic jigs in capacities up to 150 tons per hour, shortwall cutters and self-contained washers for small tonnages. Bulletin 9-118.

POWER SQUARING SHEARS.—Niagara Machine & Tool Works. Bulletin HL, describing power shears built in 6 to 12 ft. cutting lengths with 10-gage capacity. Photographs illustrate various models. Bulletin 9-119.

MAGNET CONTROLLERS.—Electric Controller & Mfg. Co. Folder announces a new adjustable controller for magnets. Controller features quick load release and a simplified two-position master switch. Bulletin 9-120.

SUCKER RODS.—Bethlehem Steel Co. Folder describes normalized sucker rods which conform to all A.P.I. specifications. Tables of chemical and physical properties are included. Bulletin 9-121.

GAS BURNER SAFETY DEVICE.—Wheelco Instruments Co. An 8-page bulletin on Flame-otrol, a gas burner safety device designed to prevent explosions in case of flame failure. Includes many typical applications and construction diagrams. Bulletin 9-122.

MOLDED PLASTIC COUPLING.—Continental Diamond Fibre Co. A sprocket type coupling constructed of molded macerated synthetic material is described in this bulletin. The coupling is available in ratings from $\frac{1}{2}$ to 85 hp. Features of light weight and great strength are claimed. Bulletin 9-123.

AIR COMPRESSORS.—Westinghouse Air Brake Co. Three catalogs describing steam driven air compressors, air cooled, two-stage compressors for garage and service stations and accessories for industrial service. Catalogs are profusely illustrated and contain innumerable engineering tables. Bulletin 9-124.

EXPANSION JOINTS.—Yarnall-Waring Co. Bulletin EJ-1906 describes Yar-Way Gun-Pakt, slip-type, expansion joints. Design permits repacking while joint is under pressure and eliminates removing the gland when inserting new packing. Complete specifications included. Bulletin 9-125.

PERFORATED METALS.—Allis-Chalmers Mfg. Co. Catalog No. 1832 describes the various types of perforated metal produced by the company for sizing, cleaning and separating operations. Cuts illustrate some of the types of perforations available. Bulletin 9-126.

SHAPERS.—Gould & Eberhardt. Catalog covers industrial shapers in sizes from 16 in. to 36 in. stroke, and tool room machines in 14 in. and 16 in. sizes. Attachments, including automatic tool lifters, tilting work tables, indexing centers and jib cranes for lifting heavy work to and from work table, are also described and illustrated. Bulletin 9-127.

TURBINE PUMPS.—Fairbanks, Morse & Co. Bulletin 6920 describes oil and water lubricated deep well turbine pumps with enclosed impellers. Large cutaway photograph explains various features of the pumps. Available with either geared or belted heads. Bulletin 9-128.

PROPANE GAS.—Phillips Petroleum Co. Bulletin 68 is devoted to propane gas service for railroads. Illustrated applications of this liquefied hydrocarbon gas include air conditioning, internal combustion engines, heating purposes in the shop, space heaters, metal cutting operations and miscellaneous applications. Bulletin 9-129.

COUNTERBORES, INTERCHANGEABLE.—Continental Tool Works Div., Ex-Cell-O Corp. Catalog CT-537 has 32 illustrated pages devoted to descriptions and detailed specifications of interchangeable counterbores, core drills, spotfacers, counterbores, milling cutters, broaches and special cutting tools, such as circular form and combination tools. Bulletin 9-130.

WELDING TIPS.—P. R. Mallory & Co., Inc. Circular describes Mallory 3 Metal, Elkaloy and Elkonite electrode materials which are claimed to outlast copper tips 5 to 1. Bulletin 9-131.

HIGH TEST IRON.—Cooper-Bessemer Corp. Use of Meehanite metal in castings that go into the construction of Cooper-Bessemer engines and other parts is outlined in a 16-page booklet. Photomicrographs, charts of physical properties and heat treatments are included. Bulletin 9-132.

WIRE AIRCRAFT PRODUCTS.—John A. Roebling's Sons Co. Booklet A-832 describes and illustrates aircraft control cords, terminals, steel ferrules, ignition cables and various other aircraft products manufactured by the company. Bulletin 9-133.

DIESEL GENERATING SETS.—Fairbanks, Morse & Co. Bulletin 3600-A2 describes the construction and application of diesel generating sets in ratings from 5.3 to 100 kva in alternating sets, and 5 to 80 kw. in direct current sets. Many typical applications illustrated. Bulletin 9-134.

WELDED PIPE.—American Rolling Mill Co. 44-page booklet lists uses of ARMCO spiral welded pipe in industrial plants. Includes technical data on thermal expansion and methods of determining wall thickness and flow charts. Bulletin 9-135.

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Dieset Cutters are cutting costs and
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costs. It will reduce the oil to water
ratio, and it will reduce the cost of
machines with large capacities
and smaller capacities.

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a single dial. It has been used on
a number of jobs, but it has
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basis. It is a very good idea.
The ChronoLog measures the time to
make a part from the time it starts
to make it until it is finished.



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Centrifuges are becoming an important part of
Auto operations. Consider
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removing the whole plant from the soil and
the plant from the soil.

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Machines

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Positive Centrifuges

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With the Model R you can make heavy cuts without vibration because of the rigid frame construction. Set-ups can be changed quickly because of the simple design. There is a wide range of spindle speeds. Indexing is remarkably fast.

Power is increased.

These features, plus many others, often make it profitable to scrap machines now operating satisfactorily and to pay for new equipment out of savings. Many manufacturers say they have gotten their investment back in less than a year!

Why not let one of our field engineers analyze your screw machine department—submit a report giving recommendations and estimated savings? It costs you nothing. It may save you plenty. Write us today.

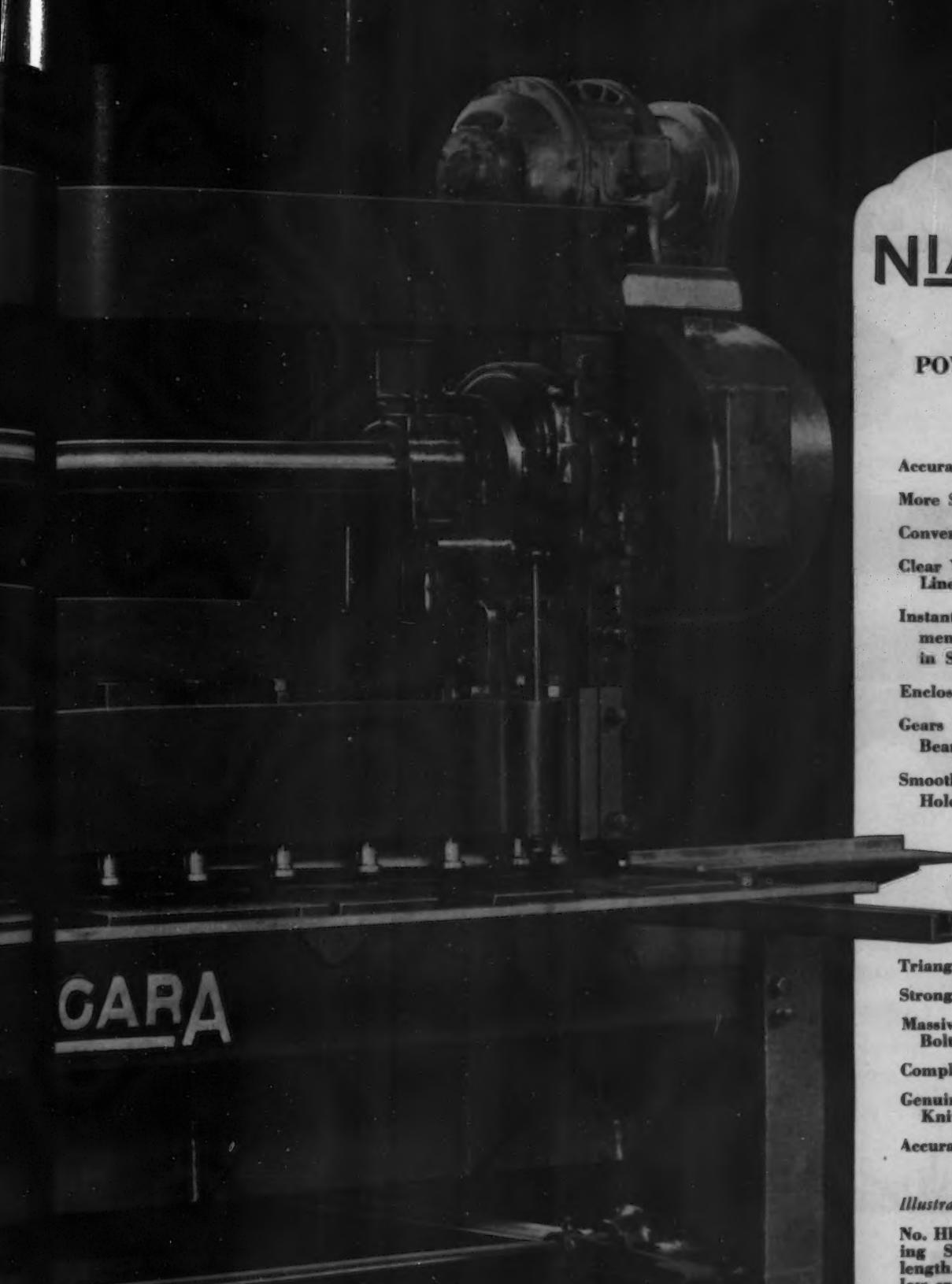
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Enclosed Drive Running in Oil

Gears Mounted on Anti-Friction Bearings

Smooth Acting Toggle Operated Holdown

18 Inch
Gap

Triangular Section Crosshead

Strong, Rigid Cast Housings

Massive Cast Bed Keyed and Bolted to Housings

Complete Accessibility at Rear

Genuine Niagara Steel Laid Knives

Accurate, Easily Adjusted Gages

Illustrated at Left:

No. HL-10 Niagara Power Squaring Shear. 10 foot cutting length. Series HL Shears have low crosshead slope for flat cutting of narrow strips.

*Write for Bulletins
on NIAGARA
Presses and Shears*

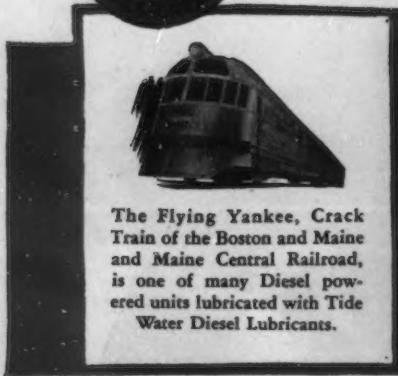
NIAGARA

"WE'VE STOPPED THE TIDE"



TIDE WATER

THERE IS A COMPLETE LINE OF TYCOL LUBRICANTS



The Flying Yankee, Crack Train of the Boston and Maine and Maine Central Railroad, is one of many Diesel powered units lubricated with Tide Water Diesel Lubricants.

Sophisticated sponges which control the rate of flow of the lubricant to the bearings, just as a sponge controls the water it has absorbed.



Maximum economy lubrication per pound of grease is assured by use of cylinder oil, with a minimum of water necessary.

THE RUNAWAY!"

THIS MANUFACTURER suffered from runaway lubrication. It would not "stay put." In his words, "Since we've been using Tide Water Green Cast Greases we've reduced the number of applications by 50%. There's also less grease used on the bearings of the mills where grease is pumped under pressure. Tide Water Grease resists the heat better. It maintains body to insure a good film to protect the bearing."

Operators in every branch of industry find that Tide Water's Green Cast Greases make light work of the tough jobs. They are compounded of the highest grade of paraffine base cylinder oil and a minimum of soap. More lubricating oil and less soap means more lubrication per pound of grease.

Look for the natural green cast . . . it identifies Tide Water's Green Cast Greases. Try them on your hardest jobs first and get the most convincing proof — the irrefutable evidence of better performance and economies of operation. We will gladly recommend the proper consistency for any application.

TIDE WATER ASSOCIATED OIL COMPANY
TIDE WATER DIVISION
17 Battery Place, New York, N. Y.

GREEN CAST GREASES

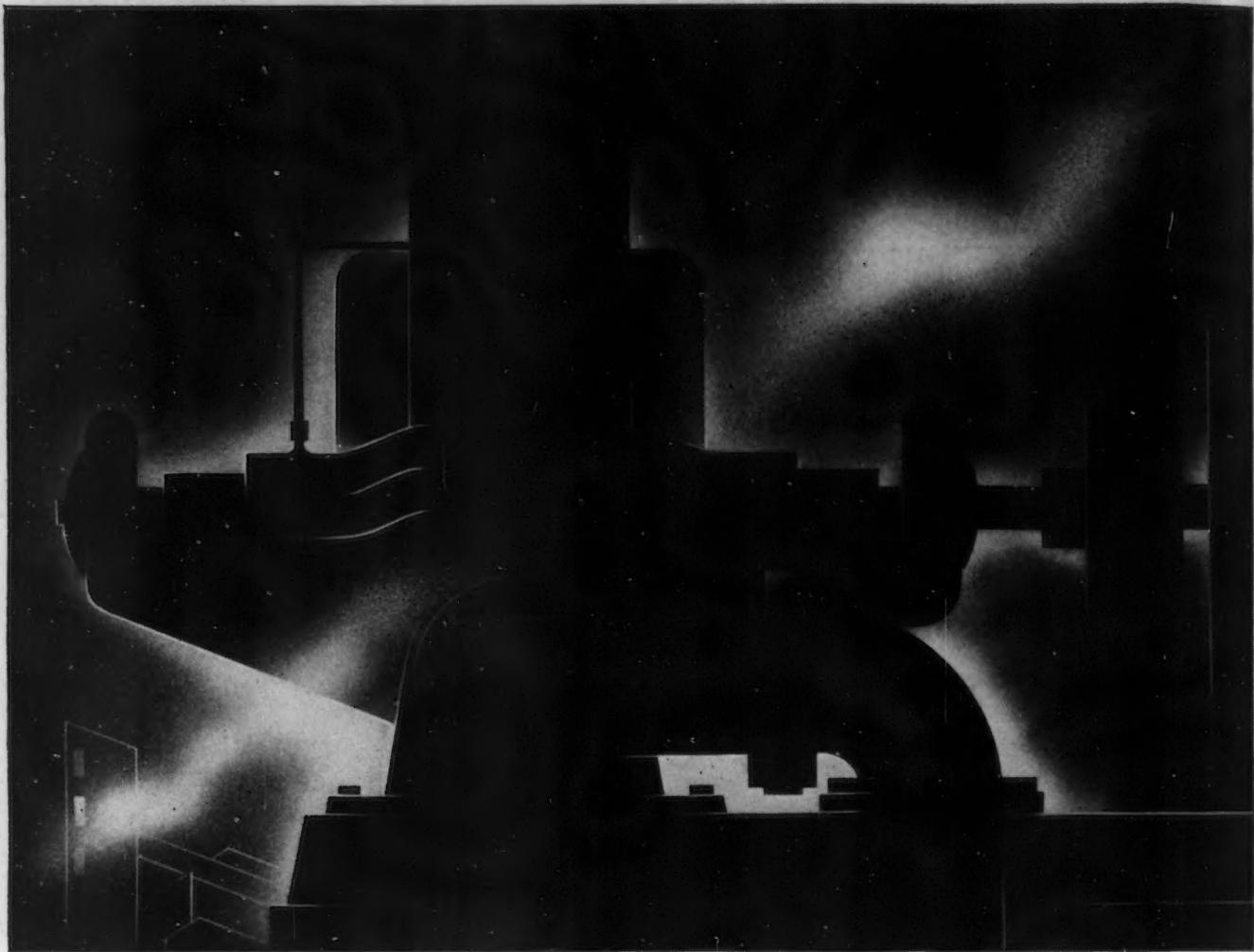
SCIENTIFICALLY ENGINEERED FOR EVERY INDUSTRIAL USE



Tide Green Cast Greases are made of paraffin stock, giving a lubricant having high flash and fire points, with maximum film strength.



Tide Green Cast Greases are compounded to withstand extreme operating conditions — for lubricating rolling mill services, for steel frame and plain bearings.



Obvious—or Effective

WHEN machine parts failures become a problem, the obvious remedy is not always the most effective.

An important and alert manufacturer of centrifugal pumps, for instance, had impeller trouble. Steel impellers were the obvious answer, but cost was a factor to be considered.

A .75% Moly iron was used—and the trouble was eliminated. This hard, strong, fine-grained iron had

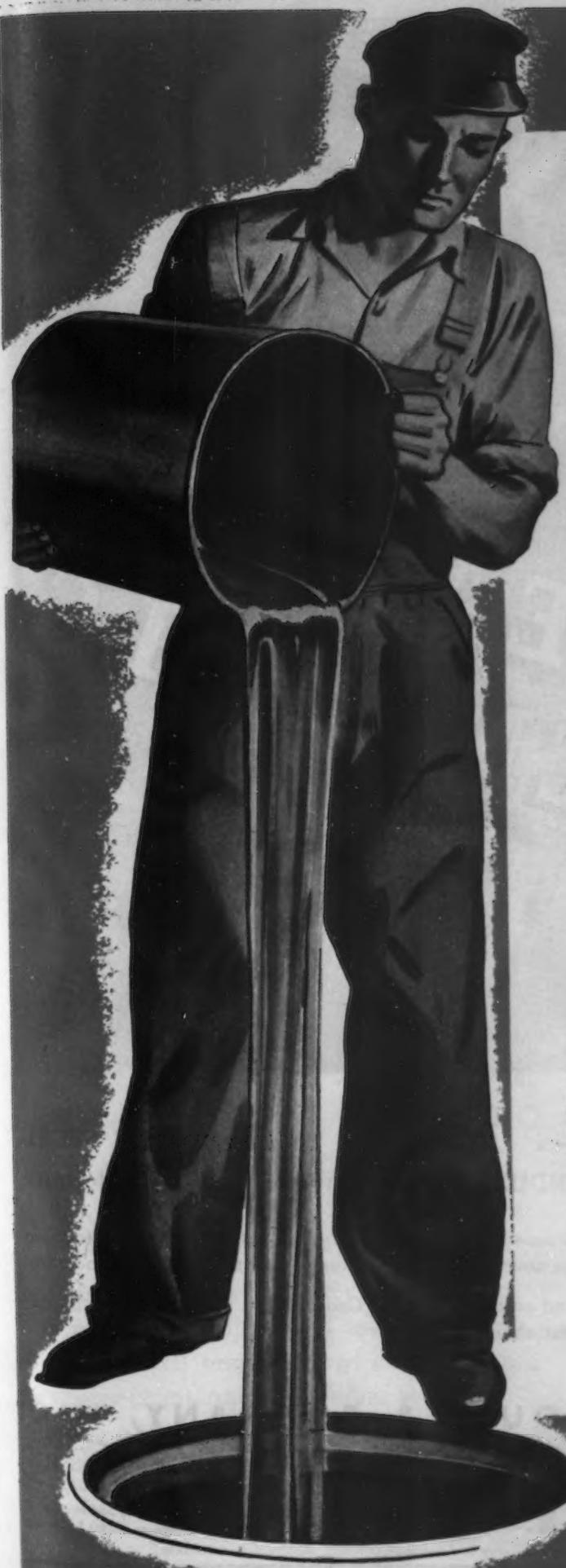
the necessary resistance to the abrasive action of the material handled by the pump. And—it held down the manufacturing cost.

Moly toughens cast iron, assures uniform structure throughout varying sections, and reduces porosity. It produces irons with high wear resistance and greater strength. It cuts production cost by eliminating many of the causes of rejects.

Our technical book, "Molybdenum," contains practical data on Moly irons and steels. It will be sent on request—as will our monthly news-sheet, "The Moly Matrix." Be free to consult our laboratory on special ferrous problems. Climax Molybdenum Company, 500 Fifth Avenue, New York City.

PRODUCERS OF FERRO-MOLYBDENUM, CALCIUM MOLYBDATE AND MOLYBDENUM TRIOXIDE

Climax Molybdenum Company



LIKE POURING OIL DOWN THE SEWER!

**Unsuitable cylinder oil cost
this company thousands of
dollars — until Shell stepped
in and solved the problem!**

STEAM engines driving the mill trains in a Pittsburgh steel mill were constantly failing. Tonnage costs were increasing . . . the situation threatened a new low in production, and after trying twenty different lubricants, the problem was still unsolved.*

Shell was called in. A careful analysis of the operating conditions disclosed that while the cylinder oil then in use was being fed in excessive amounts, it failed to resist the washing effect of the condensate and provide the necessary lubricating film on frictional surfaces. The result was frequent stalling under heavy loads. At Shell's recommendation, a Shell Lubricant designed to meet these unusual conditions was applied.

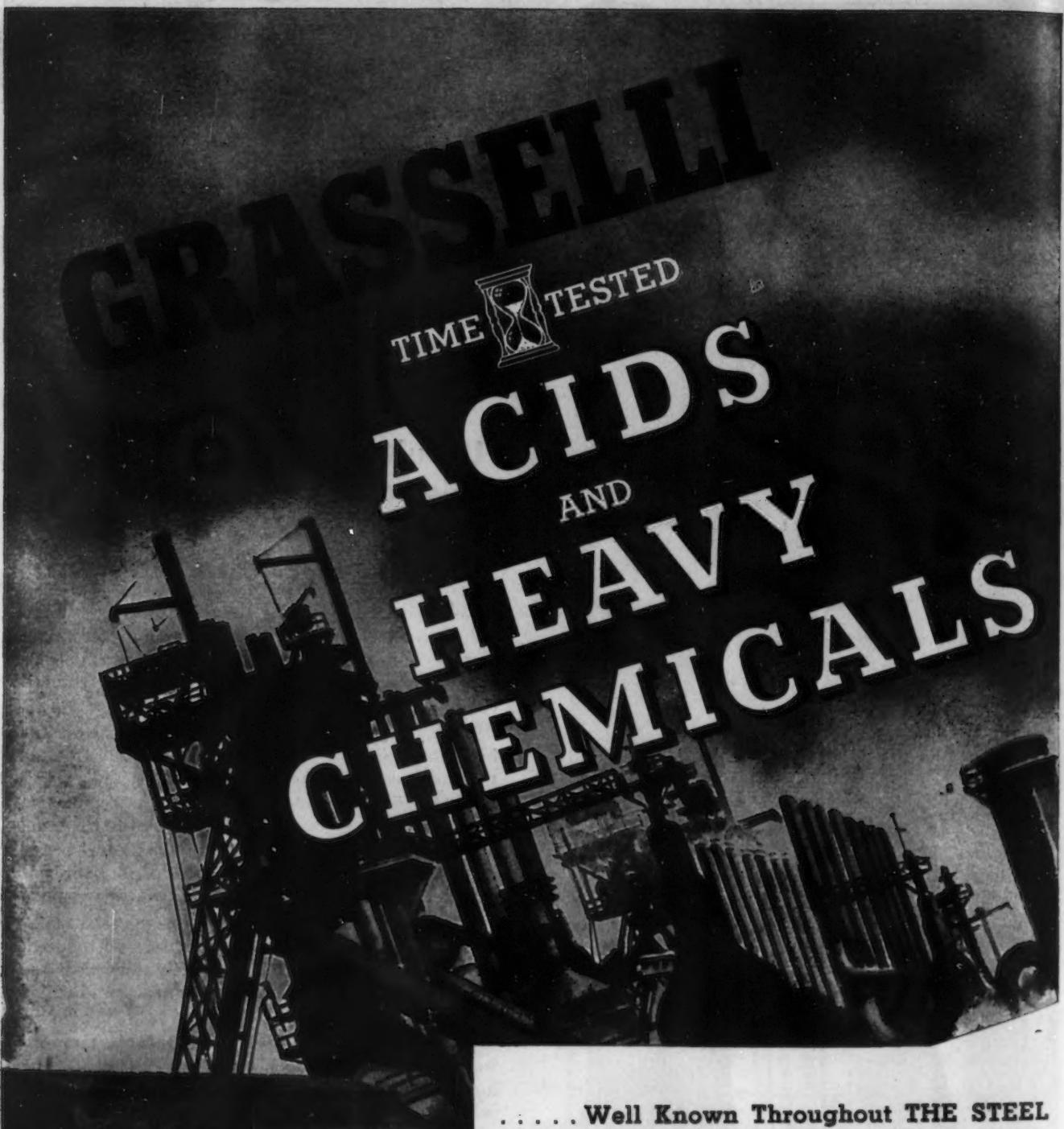
The results were immediate. Tonnage costs, maintenance costs and oil consumption were all reduced. And during the period immediately following the application of the Shell Lubricant, a new plant production record was established.

The manner in which Shell solved this plant's problem is characteristic. Shell's "Invisible Element," the ingenuity and resourcefulness born of long experience, is applied to every industrial lubrication problem. This plus in lubrication is always available to you. Simply write or phone your nearest Shell office.

*An actual case history from Shell's files

SHELL STEEL MILL LUBRICANTS





... Well Known Throughout THE STEEL INDUSTRY for High Quality and Uniformity

Aluminum Stearate
Caustic Soda
C. P. Reagents
Hydrofluoric Acid
Inhibitors
Mono Phosphate of Soda
Muriatic Acid
Nitrate of Soda
Nitric Acid
Zinc Sulphate

Sal Ammoniac
Sal Soda
Silicate of Soda
Sulphate of Alumina
Sulphur
Sulphuric Acid
Tinning Flux
Tri-Sodium Phosphate
Zinc Ammonium Chloride

Grasselli Chemicals have always been produced to meet the needs of growing industry and to create new industry.

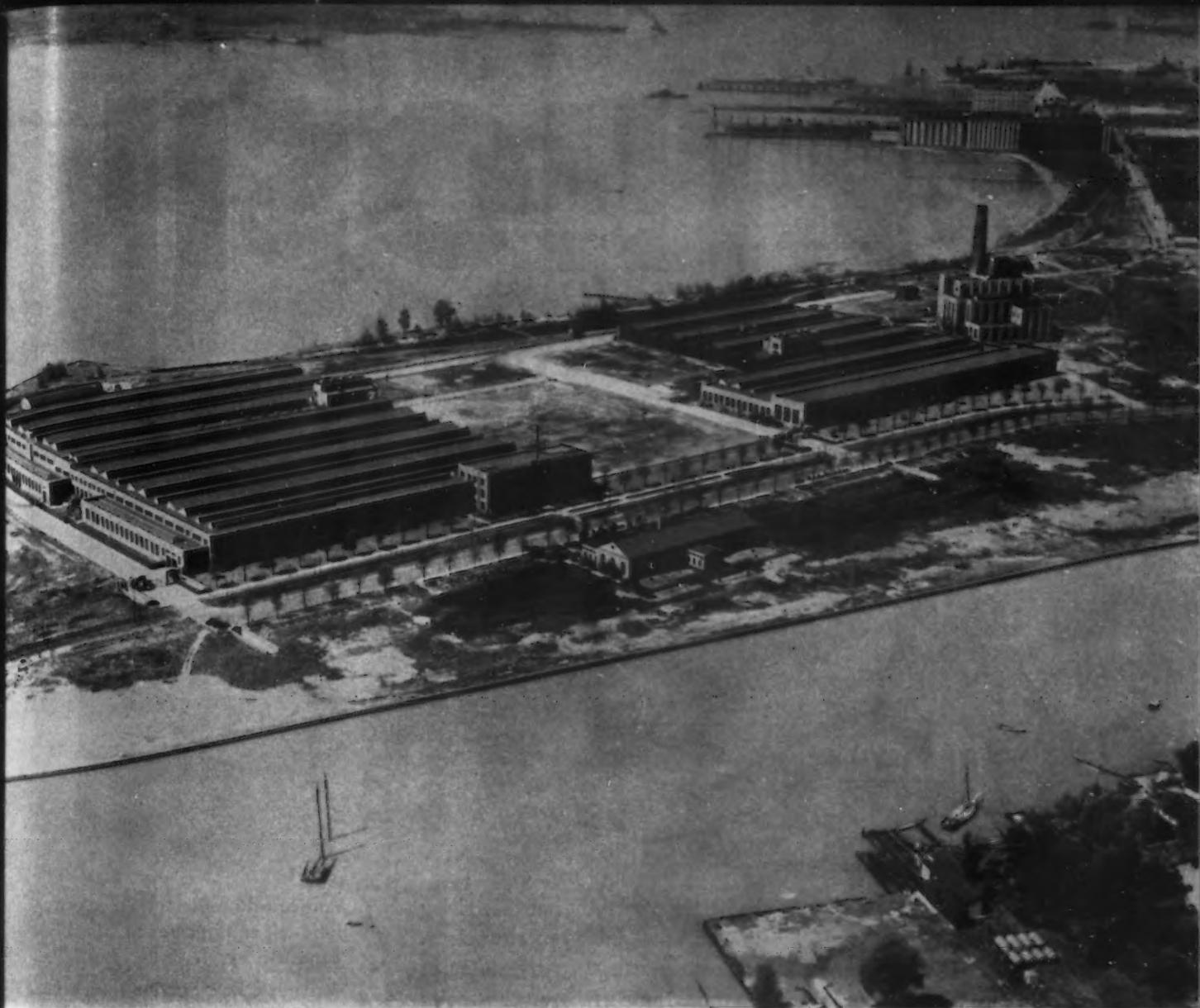
And so for metals the Grasselli list includes every important chemical.

E. I. DU PONT DE NEMOURS & COMPANY, INC.
GRASSELLI CHEMICALS DEPARTMENT

Wilmington, Delaware

Albany Boston Chicago Cleveland Milwaukee New Orleans Philadelphia St. Louis San Francisco, 584 Mission St.
Birmingham Charlotte Cincinnati Detroit New Haven New York Pittsburgh St. Paul Los Angeles, 2260 E. 15th St.

Represented in Canada by CANADIAN INDUSTRIES, LTD., General Chemicals Division, Montreal and Toronto



Western Electric Company, Baltimore, Md. • Note room for future growth

The Owners of this great plant have given us Contracts totaling approximately \$15,000,000

WE DO IT ALL

REPEAT ORDERS prove our point. Men who buy factory buildings repeatedly, usually do buy them our way.

Four new orders from old customers total six million dollars. • These contracts include all engineering, construction, power plant, and equipment work, complete and ready to run.

A good bargain is a simple one. Working under a one-page contract, our experienced Engineers, Construction Men, and Machinery Experts . . . DO IT ALL.

We will gladly give you preliminary sketches and estimates, with definite date for quick completion, if you write, wire, 'phone, or come, to our nearest office.

The H.K.
Ferguson
Co.

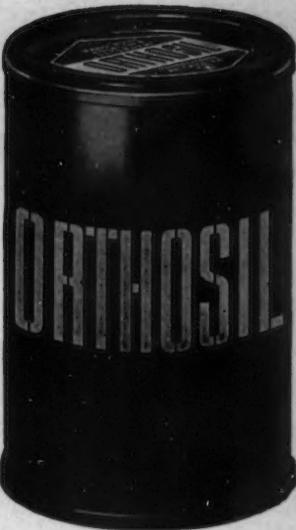
ENGINEERS AND BUILDERS

CLEVELAND, OHIO • HANNA BUILDING • PHONE CHERRY 5870 • NEW YORK CITY • 25 WEST 43rd STREET • PHONE BRYANT 9-7227
SAN FRANCISCO • 38 MAIN STREET • EXBROOK 5059 • TORONTO, CANADA • 1221 BAY STREET • KINGSDALE 3646 • MEXICO CITY • MEXICO

ORTHOSIL

TRADE MARK

**Blasts off the dirt and oil in
electrolytic metal cleaning**



ORTHOSIL solutions are better conductors of electricity than those of almost any other alkaline salt in similar concentrations. The notably low surface tension of Orthosil solutions enables them to penetrate beneath the dirt and oil film on the surface of the metal being cleaned.

These solutions get into the pores of the metal . . . making contact and generating bubbles of gas in copious quantity. Grease and dirt are lifted violently from the metal during electrolytic cleaning . . . literally blasted into the Orthosil solution.

Orthosil is an *anhydrous* granular material unhampered by inert salts and relatively weak alkaline diluents. In the heavy-duty cleaning of metals it is outstanding for its quick action. Try Orthosil . . . check its advantages against those of any other industrial detergent. Write for full details — address Department E.

- 1 Particularly efficient in electrolytic cleaning due to its high conductivity.
- 2 Assures quicker action than other alkalis.
- 3 Prevents grease and dirt from re-depositing.
- 4 Easy to pour, quick to dissolve.
- 5 Anhydrous—highly concentrated—economical.
- 6 Quickly removes the grease, soot, dust, and various kinds of dirt unaffected by pickle acid.
- 7 Leaves material clean for further processing.



PENNSYLVANIA SALT MANUFACTURING COMPANY • Est. 1850

Widener Bldg., Philadelphia, Pa.

Offices: New York • Chicago • St. Louis • Pittsburgh • Tacoma • Wyandotte

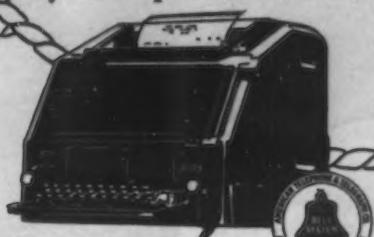
PENNSYLVANIA SALT
chemicals

**STEAMSHIP COMPANY
CO-ORDINATES CARGOES
ON LAND AND SEA BY
TELETYPEWRITER**

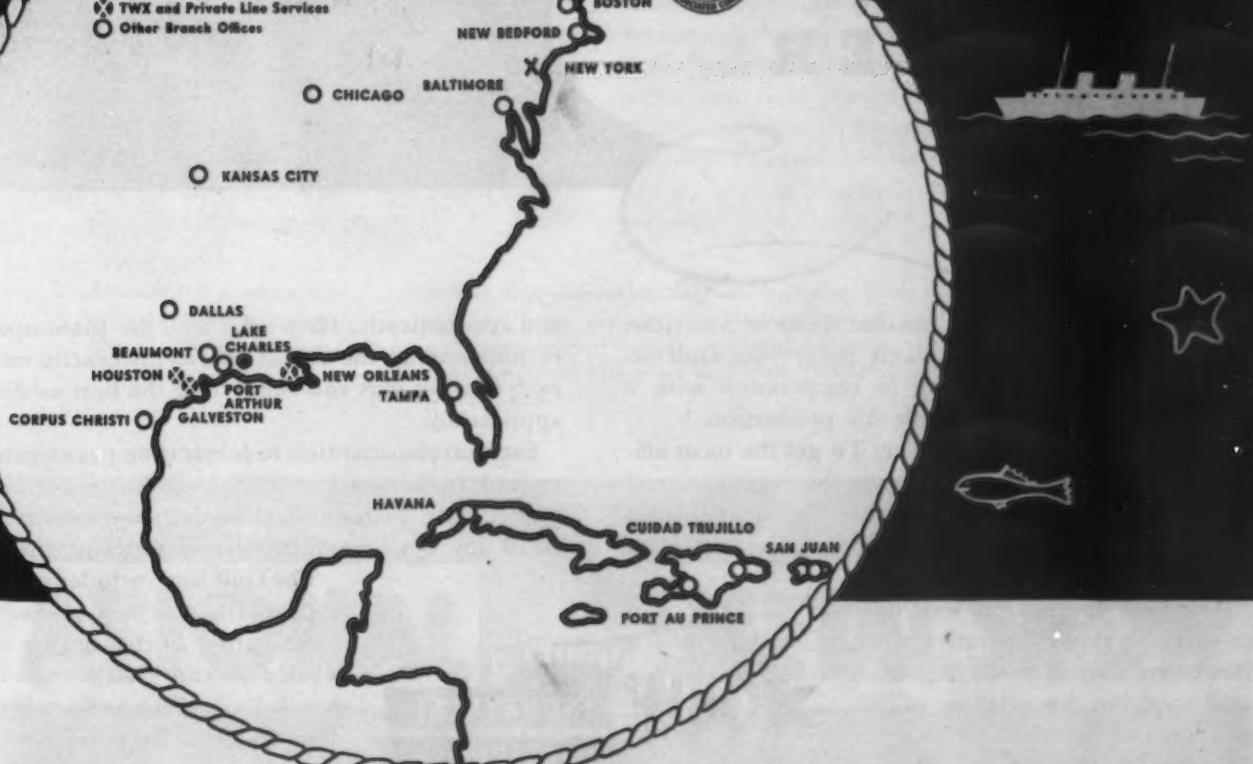
With widely separated units — ports on the Gulf and in the Caribbean, branches throughout the mid-west and eastern United States — Lykes Brothers Steamship Company faced a real co-ordination problem. Bell System Teletypewriter Service helped solve it simply and profitably.

Now all operations are charted at headquarters in Houston, Texas. With the speed of typing-by-wire, branches have up-to-the-minute information on rates and space available on ships. Handling of cargoes is minimized. Branches secure bids on small space shipments at low cost, and keep customers posted on prices and delivery.

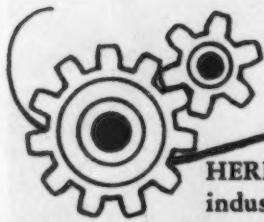
A Lykes official says of Teletypewriter Service that its accuracy, alone, saves time and dollars for the company. Your business, like Republic Steel, Bethlehem Steel, and thousands of other subscribers, may use it profitably. Call a Bell System representative and talk it over. No charge.



- Private Line Teletypewriter Service
- ✖ Teletypewriter Exchange Service (TWX)
- ❖ TWX and Private Line Services
- Other Branch Offices



PARTNERS



HERE is a familiar scene in American industrial plants today—the Gulf lubrication engineer working in cooperation with a plant man who is responsible for production.

Both have a definite objective: To get the most efficient lubrication possible for every bearing, gear and moving part in the plant. So they "team up," pool their knowledge and experience in a united effort to defeat friction.

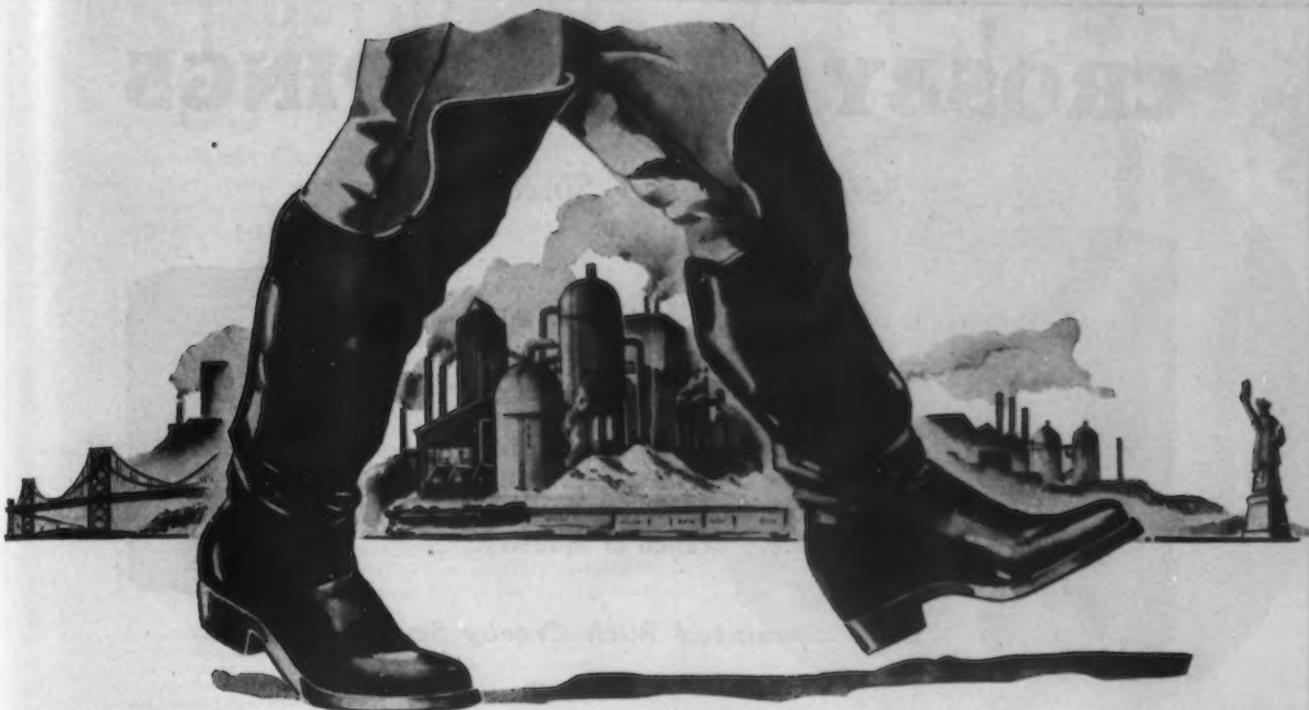
The Gulf engineer is well fitted to carry on this cooperative work. His entire time is spent in gaining and applying knowledge of oils and greases—to the end that machines may operate more efficiently

and economically. He works with the plant operator, recommending the use of lubricants exactly suited to each moving part and suggesting the best methods of application.

Such careful attention to lubrication pays a generous reward in lowered costs for maintenance, and for power. And, better still, the results are further reflected in improved production from all plant machinery.

The Gulf line includes more than 400 quality oils and greases. The combination of this quality line of lubricants and Gulf's engineering counsel can help *you* attain maximum efficiency for every machine in your plant.





MODERN THOUSAND-LEAGUE BOOTS

If a man had magic boots capable of covering 1000 leagues at a stride, it would still take him many weeks each year to see the most important developments in the metal industry. In five days at the National Metal Show he can see them all—and that's no fairy story!

By spending five days at Atlantic City in October you will see displays of more than 225 leading industrial organizations . . . actual operating exhibits of newest developments in plant and research equipment . . . every aisle in the huge auditorium packed with ideas in metal research, production and equipment . . . every exhibit manned by metal experts welcoming questions about their products.

For complete program, address American Society for Metals, 7016 Euclid Ave., Cleveland, Ohio.

Make your preparations for National Metal Show now . . . don't forget that every step you take at the Show will be like walking in "thousand-league" boots! For hotel reservation write Wm. B. Coleman, Chairman, Committee on Hotels, 16 Central Pier, Atlantic City, New Jersey.

Sponsored by
THE AMERICAN SOCIETY for METALS

NATIONAL

AMERICAN INSTITUTE of MINING & METALLURGICAL ENGINEERS
THE WIRE ASSOCIATION



October 18-22
ATLANTIC CITY AUDITORIUM

METAL SHOW

AMERICAN SOCIETY of MECHANICAL ENGINEERS
AMERICAN WELDING SOCIETY

CROSBY for STAMPINGS

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ALL our efforts have been concentrated on one product — STAMPINGS—for 40 years. We have made stampings, deep, intricate, heavy, light, large and small, for nearly every branch of industry.

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<p>TRACK SPIKES BOAT SPIKES DOCK SPIKES GUARD SPIKES TRACK BOLTS</p>	<p>STEEL BARS IRON DEFORMED REINFORCING</p> <p>W. AMES & CO. ESTABLISHED 1859 ROLLING MILL FACTORY JERSEY CITY, N.J. WAREHOUSE OFFICE</p>	<p>MACHINE BOLTS TIE RODS WASHERS SPLICING BARS RIVETS—NUTS</p>
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LEE-BUILT SPRINGS

A little higher — A lot better

COMPRESSION — EXTENSION — FLAT — TORSION — WIRE FORMS — STAMPINGS

LEE SPRING CO., Inc. 30 Main Street, Brooklyn, N.Y.



THE ATHENIA STEEL CO.

Clifton Ave., Clifton, N.J.

Works, Athenia, N.J.

Makers of High Grade Tempered and Polished Steel for Clock, Watch, Meter and Typewriter Springs. Also Wound Springs. Tempered and Untempered Steel for other purposes. Special quality equal to finest imported for finish and accurate rolling. Also Stainless Steels of various grades.

AGENTS:

Lapham Hickey Co.—3333 W. 47th Place, Chicago, Ill.—414 United Artists Bldg., Detroit, Mich.
E. F. Krause & Co.—480-440 Commercial St., Los Angeles, Calif.
Hill Chase & Co.—Richmond and Ontario Sts., Philadelphia, Pa.
Wetherell Bros. Co.—251 Albany St., Cambridge, Mass.

New Industrial Literature!

This is the title of a page in this issue reviewing new catalogs, bulletins, etc. See index for page number.

JUST BETWEEN US TWO

Irate Reader Plunks Our "E"

SPEAKING of misspelled words—recently we upheld to scorn a mild typographical error in a letter from a Wichita Falls manufacturer—placing a superfluous apostrophe in the possessive pronoun *its*.

He writes:

"In your July 22 column you say, . . . accompanied by banjos." My dictionary reveals that the plural of *banjo* is *banjos*. People who live in glass houses . . ."

Not one of eight different dictionaries supports our spelling, so we plead guilty, that is, in the eyes of people who allow themselves to be hamstrung by dictionaries. *Banjos* sounds like the name of a tropical fruit or an edict against the worship of Chinese gods. *Banjoes* is so obviously superior that it is only a matter of time before the dictionary people catch up to us.

Editor Bares Teeth

A N Iron Age alumnus who after graduating from our shipping room about ten years ago took a left turn, landed in one of New York State's better penitentiaries.

He sends us the institution's well-edited monthly magazine. The audience is apparently hypercritical for in the current issue the editor says:

"A large percentage of the inmate body is definitely antagonistic toward this, their own publication. To them, each succeeding issue has become increasingly intolerable. . . . Among nineteen hundred inmates there must be SOME who can place one misspelled word after another to make sense. So, if you don't like the current crop of material, send in yours . . ."

All But One Are Orchids

THE Aug. 19 editorial, "May We Suggest a Program?", unloosed a great chorus of "Amens" and a lone Bronx cheer. Example of the former—from a Cincinnati machine tool builder to John H. Van Deventer, editor of *The Iron Age*:

"You certainly hit the nail on the head again. . . . I consider your work most outstanding."

The Bronx cheer—from "S. W.", an anonymous Chicagoan:

"That was a wonderful 'umbrella' the steel industry built up under Hoover prosperity to hold over us—maximum of one day's pay a week in 1932. How would you like to go on one day's pay per pay period—or even two—and no capital to call on? We had J. H. Van Deventer's program 1921-1929, and it did not work."

Tailored to His Economic Measure

A CLEVELAND reader writes:

"When I entered my tailor's shop in the Superior Arcade, there tacked on his desk was your editorial on the three R's—Aug. 12 *Iron Age*. A customer of his had sent it to him. He considered it the ne plus ultra of sound political doctrine—great good sense," he said."

Layer-Upper of Moth-Proof Treasure

JOSEPH SCHMIDT, Whingham, Ont., farmer, hoards steel. He has \$2,000 worth of new material stored in his barn and expects to cash in at a good profit in the event of a European war.

Yelp

DAILY we thank our stars for a becoming modesty, which sets us apart from the great mass of publishers, who are as a group great braggarts. For example, a certain publication, whose name we shall, for decency's sake, withhold, boasts untruthfully:

"Of all magazines, *Time* leads in the total number of advertising pages (1,684 in the first six months of 1937).

Of the 8,040 magazines published in the United States, we know at least one that beat that record, and by no mere nose either. *The Iron Age* published in the first half of '37 a total of 2,368 advertising pages.

Time's boast becomes truth only if the word "general" be inserted before the word "magazine."

Stoppers

L ET'S make medicine . . . the council fire is lit.—NIAA. Written in blood and red ink.—American Pressed Steel Co. This hold-up man is working many plants.—Fairbanks, Morse & Co.

Match Your Wits

If you are extra bright you can pick up the three matches farthest left, rearrange them, and form four equilateral triangles, all of the same areas. At least Fred W. (Westinghouse Air Brake) Pennington, Wilmerding, Pa., who sent in the problem, says you can.



—A.H.D.

AIR IS CHEAP!



CURTIS AIR CYLINDERS

can do hundreds of power jobs better at less cost

Plants everywhere, like the packing house above, have effected important savings by using Curtis Air Power for jobs formerly done by hand or other types of mechanical equipment.

Curtis Air Cylinders or Hoists are inexpensive and easy to install. The power cost is low and upkeep is negligible. Control is easy and accurate. No harm can result from overloading or bad atmospheric conditions.

Increase plant efficiency—and profits. Write for results obtained by other plants, descriptive material and prices.

CURTIS PNEUMATIC MACHINERY CO.

1948 Kienlen Avenue, St. Louis, Mo.
NEW YORK • CHICAGO • SAN FRANCISCO

CURTIS

COMPRESSORS • AIR HOISTS • I-BEAM CRANES AND TROLLEYS

"The Skyscraper by the Sea"



An Invitation to members of the

NATIONAL METAL EXPOSITION

to make The Claridge their home
during their Annual Convention,
October 18th to 22nd, 1937.

European Plan: Single from \$4.00
Double from \$6. Also American Plan

For reservations call:

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Joseph P. Binns, Manager

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LELAND-GIFFORD COMPANY

Worcester, Mass.

Drilling Machinery
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Tapping Attachments and Multiple Heads

GOSS and DE LEEUW

MULTIPLE SPINDLE

CHUCKING MACHINES

Two, Four, Five Spindles • Work and Tool Rotating Types
GOSS & DE LEEUW MACHINE CO., NEW BRITAIN, CONN.

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IRON AGE

you contact over 70,000
readers

Products Index

ABRASIVE WHEELS—See Grinding Wheels

ABRASIVE CLOTH & PAPER
Norwalk Co., Worcester, Mass.

ABRASIVES—Steel Shot and Grit
Panaborn Corporation, Hagerstown, Md.

ACCESSORIES—Welding

Lincoln Electric Co., The, Cleveland.

ACCUMULATORS—Hydraulic

Baldwin-Southward Corp., Southward Div., Philadelphia.

Hydraulik GmbH, Duisburg, Germany.

Lake Erie Engineering Corp., 68 Kenmore St., Buffalo, N. Y.

Wood, R. D., & Co., Philadelphia.

ACETYLENE—Dissolved in Cylinders &

Small Tanks

Air Reduction Sales Co., 60 East 42nd St., N. Y. C.

Linde Air Prod. Co., The, 30 East 42nd St., N. Y. C.

ACID-PROOF CEMENT

Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

ACID-PROOF CONSTRUCTION

Atlas Mineral Prods. Co. of Pa., The, Mertztown, Pa.

ACIDS—Pickling

American Chemical Paint Co., Ambler, Pa.

Du Pont de Nemours, E. I., & Co., Inc.

Grasselli Chemicals Dept., Wilmington, Del.

Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

AIR CONDITIONING EQUIPMENT

American Blower Corp., 6000 Russell St., Detroit

AIRMETERS AND VOLTMETERS

Weston Electrical Instrument Corp., Newark, N. J.

AIR TANKS AND CYLINDERS

Petroleum Iron Works Co., The, Sharon, Pa.

Scaife, William B., & Sons Co., Pittsburgh.

ALLOYS—Copper

American Brass Co., The, Waterbury, Conn.

ALLOYS—Ferro

Electro Metallurgical Sales Corp., 30 East 42nd St., N. Y. C.

ALLOYS—Magnesium

Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

ALLOYS—Phosphor Bronze

Phosphor Bronze Smelting Co., The, Philadelphia (N. J.) Metal Co.

ALLOYS—Resistance Welding

Electroly Co., Inc., 58 Church St., New York City.

ALLOYS—Titanium

Titanium Alloy Mfg. Co., The, Niagara Falls, N. Y.

ALLOYS—Tungsten

Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

ALLOYS—Vanadium

Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

ALLOYS—Zinc Base Die Casting

New Jersey Zinc Co., The, 160 Front St., N. Y. C.

ALUMINUM

Aluminum Co. of America, Pittsburgh.

Seligman, Arthur, & Co., Inc., 30 Rockefeller Plaza, R. C. A. Bldg., N. Y. C.

AMMETERS AND VOLTMETERS—Recording

Leeds & Northrup Co., Philadelphia.

AMMONIA RECOVERY PLANTS

Koppers Co., Pittsburgh.

ANGLES, BEAMS, CHANNELS AND TEES

Carnegie-Illinois Steel Corp., (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Columbia Steel Co., (U. S. Steel Corp. Subsidiary), San Francisco, Calif.

Inland Steel Co., Chicago.

Jones & Laughlin Steel Corp., Pittsburgh.

Ryerson, Jos. T., & Son, Inc., Chicago.

Scully Steel Products Co., (U. S. Steel Corp. Subsidiary), Chicago.

Steel & Tubes, Inc., Cleveland.

Tennessee Coal, Iron & Railroad Co., (U. S. Steel Corp. Subsidiary), Birmingham, Ala.

Weirton (W. Va.) Steel Co.

ANGLES, BEAMS, CHANNELS & TEES—Magnesium Alloys

Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

ANNEALING—See Heat Treating

ANNEALING BOXES

Lebanon (Pa.) Steel Foundry.

Petroleum Iron Works Co., Inc., Sharon, Pa.

United Engineering & Fdry. Co., Pittsburgh.

ANNEALING COVERS

Petroleum Iron Works Co., The, Sharon, Pa.

Surface Combustion Corp., 2375 Dorf St., Toledo.

ANODES—All Types

Du Pont de Nemours, E. I., & Co., Inc.

Grasselli Chemicals Dept., Wilmington, Del.

Seymour (Conn.) Mfg. Co.

Udyrite Co., The, Detroit.

ANODES—Cadmium

Du Pont de Nemours, E. I., & Co., Inc.

Grasselli Chemicals Dept., Wilmington, Del.

Udyrite Co., The, Detroit.

APPAREL—Welding

Lincoln Electric Co., The, Cleveland.

ARBORS

Cincinnati (Ohio) Milling Mach. Co., The.

Morse Twist Drill & Mch. Co., New Bedford, Mass.

ARMORING MACHINERY—Cable, Wire, Hose

Sleeper & Hartley, Inc., Worcester, Mass.

ARRESTERS—Spark

Harrington & King Perforating Co., Chicago.

ASBESTOS

Carey, Philip, Co., The, Cincinnati.

AXLES—Car or Locomotive

Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

BABBITT METALS

Cadman, A. W., Mfg. Co., Pittsburgh, Pa.

BALANCING EQUIPMENT

Cisholt Machine Co., Madison, Wis.

BALING PRESSES—Scrap—See Presses

Baling

BALLS—Bushing

Abbott Ball Co., The, 1047 New Britain Ave., Hartford, Conn.

Hartford (Conn.) Steel Ball Co., The.

BALLS—Steel, Brass or Bronze

Abbott Ball Co., The, 1047 New Britain Ave., Hartford, Conn.

Hartford (Conn.) Steel Ball Co., The.

New Departure Div., General Motors Corp., Bristol, Conn.

BAR INDUSTRIES, INC.

St. Paul, Minn.

BANDS—Shear

Acme Steel Co., Chicago.

Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.

BANDS—Welded

Amer. Welding & Mfg. Co., Warren, Ohio.

BARRELS—Burning

Abbott Ball Co., The, 1047 New Britain Ave., Hartford, Conn.

Ranshoff, N. Inc., Cincinnati.

BARRELS—Tumbling

Baird Mch. Co., The, Bridgeport, Conn.

Hartford (Conn.) Steel Ball Co., The.

Ranshoff, N. Inc., Cincinnati.

BARRELS—Tubing

Baldwin Mch. Co., The, Bridgeport, Conn.

Hartford (Conn.) Steel Ball Co., The.

Ranshoff, N. Inc., Cincinnati.

BARRELS—Welded

Amer. Welding & Mfg. Co., Warren, Ohio.

BARRELS—Welding

Abbott Ball Co., The, 1047 New Britain Ave., Hartford, Conn.

Ranshoff, N. Inc., Cincinnati.

BARRELS—Welding

Republic Steel Corp., Cleveland, Ohio.

BARRELS—Aluminum

Aluminum Co. of America, Pittsburgh.

BARS—Brass, Bronze or Copper

Bunting Brass & Bronze Co., Toledo, Ohio.

Johnson Bronze Co., 505 So. Mill St., New Castle, Pa.

BARS—Cold Drawn

American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.

Bliss & Laughlin, Inc., Harvey, Ill.

Union Drawn Steel Co., Massillon, Ohio.

BARS—Concrete, Reinforcing

Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.

Jones & Laughlin Steel Corp., Pittsburgh.

Laclede Steel Co., St. Louis, Mo.

Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.

BARS—Magnesium Alloys

Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

BARS—Rustless

Bustless Iron & Steel Corp., Baltimore, Md.

BARS—Steel

Ames, W., & Co., Jersey City, N. J.

Andrews Steel Co., The, Newport, Ky.

Bethlehem (Pa.) Steel Company.

Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Great Lakes Steel Corp., Detroit.

Inland Steel Co., Chicago.

Jones & Laughlin Steel Corp., Pittsburgh.

Republic Steel Corp., Cleveland, Ohio.

Ryerson, Jos. T., & Son, Inc., Chicago.

Scully Steel Products Co. (U. S. Steel Corp. Subsidiary), Chicago.

Steel & Tubes, Inc., Cleveland.

Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.

Timken Roller Bearing Co., The, Canton, O.

Timken Steel & Tube Div., The, Timken.

Roller Bearing Co., Canton, O.

Weirton (W. Va.) Steel Co., The.

Youmans (Ohio) Sheet & Tube Co., The.

BATTERIES—Storage

Electric Storage Battery Co., The, Philadelphia.

BATTERY CHARGERS

Cutter-Hammer, Inc., Milwaukee.

BEAMS—See Angles, Beams, Channels and Tees

BEARINGS—Ball

Bantam Bearings Corp., The, South Bend, Indiana.

Federal Bearings Co., Inc., The, Poughkeepsie, N. Y.

New Departure Div., General Motors Corp., Brooklyn, N. Y.

Non-Hoffmann Bearings Corp., Stamford, Conn.

SKF Industries, Inc., Front St. & Erie Ave., Philadelphia, Pa.

Schaeffers Mfg. Co., Poughkeepsie, N. Y.